COAL AGE

OCTOBER, 1959

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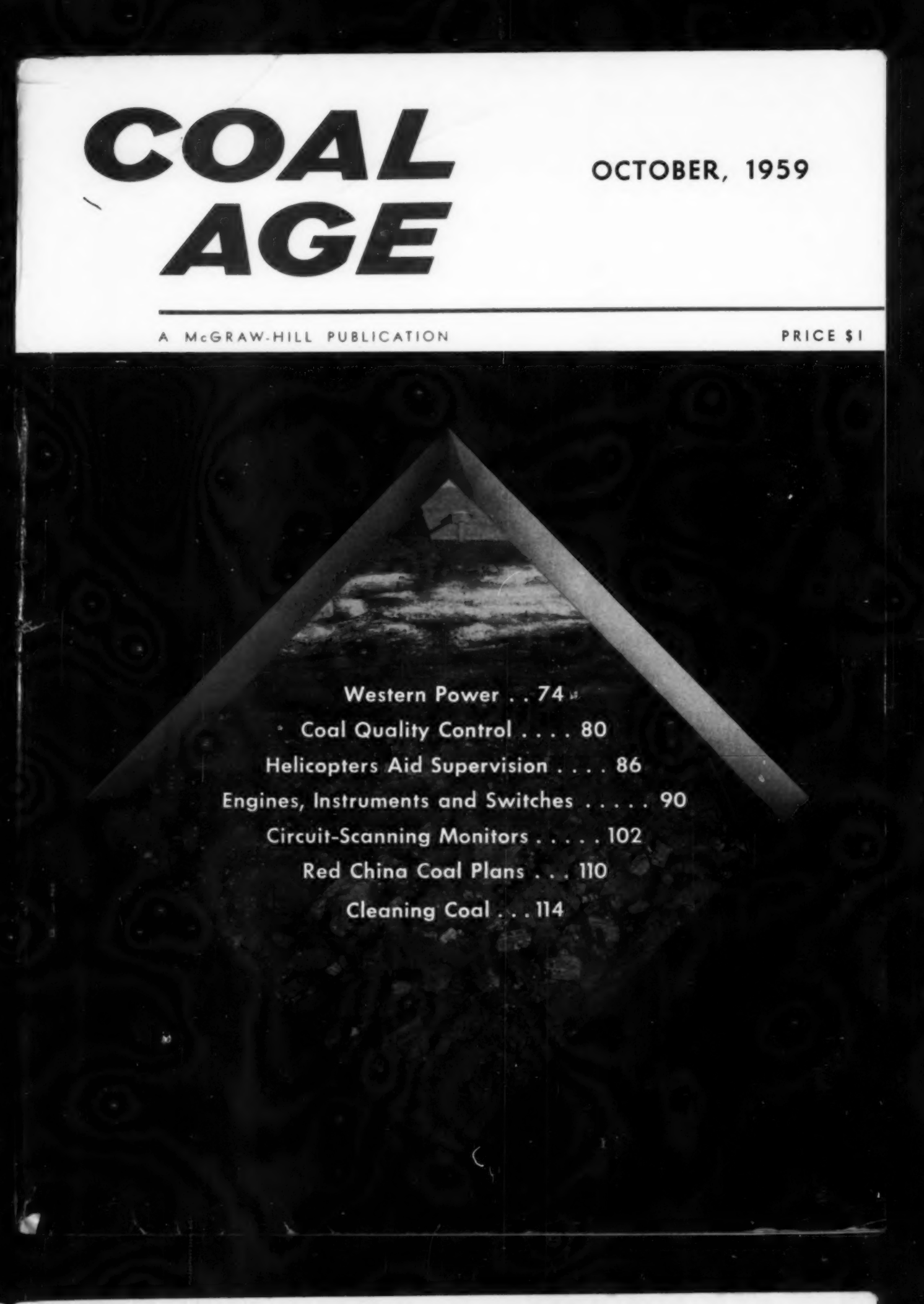

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Now—more light, less weight, longer life with

NEW EDISON MODEL S ELECTRIC CAP LAMP

MSA announces another new *high* in lighting efficiency in the world's most popular cap lamp. Increased light output of the new Edison Model S Lamp assures greater safety for the miner, more tons per shift for the operator. Let's face a fact: Dimness costs money. *Fair* lighting does only a *fair* job. Maximum lighting—the brilliant, unfailing Edison Model S kind—helps get jobs done with top speed and safety. And the simplified method of charging new Model S Batteries—with the AUTOMATIC LOW-VOLTAGE SYSTEM—is convenient, thrifty and highly efficient. Lets miners take their lamps and rack them—quickly—without loss of time or waste motion. When planning a new lamphouse installation or modernizing your present one, call in the MSA Representative. MSA can help you solve your lighting problems.

Newly issued U.S. Bureau of Mines Approval 6D-31, April 16, 1959.

MSA SAFETY EQUIPMENT HEADQUARTERS

MINE SAFETY APPLIANCES COMPANY • 201 North Braddock Avenue, Pittsburgh 8, Pennsylvania

MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED • Toronto, Calgary, Edmonton, Montreal, Sydney, Vancouver, Winnipeg

Look how small the headpiece is. Weighs only a few ounces. Feels even lighter on the head. You get a clear, sharp spot every time.

Increase in working light appeals to me. This new Edison Model S gives 15% more than we ever had before. And they didn't cut their bulb service life rating to do it. The double filament bulb means we'll always have working light to finish the shift. Each filament of the Edison Model S krypton-gas-filled bulb has a 400-hour designed life.

Just watch the improvement in our safety and tonnage reports. More light. Less weight. Longer life. Even the battery's better. It has a new active material that boosts service life. They went all-out to meet the miner's needs with this one.

B.F.Goodrich

Hose drains acid pools to keep a coal mine dry

B.F.Goodrich improvements in rubber brought extra savings

GETTING rid of pools of water that collect in this coal mine is a constant job. At first, iron pipe was used to drain the pools. But the water contains acid that eats holes in metal. Flexible rubber hose, reinforced with wire, was tried, and worked fine until it was run over several times and crushed flat by heavy mining equipment.

When a B.F.Goodrich man heard of the trouble, he recommended a B.F. Goodrich hose that springs back to shape when run over. A continuous coil of hemp rope, specially treated and buried in thick rubber, makes this hose strong enough to stand the suction, yet flexible enough to spring back to its round shape after being crushed.

Since 1953, B.F.Goodrich water hose has worked night and day to keep this mine dry. It has gulped millions of gallons of acid water, been run over countless times by shuttle cars and other equipment. But despite the abuse, it lasts four times longer than the hose used before, saves an estimated 75% in maintenance costs.

Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose described here. And, as a factory-trained specialist in rubber products, he can answer your questions about the many rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Department M-715, Akron 18, Ohio.*

B.F.Goodrich ***industrial rubber products***

Harmattan Mine coal haulers have been using STANOLUBE HD-M Motor Oil for 10 years --here's why

Pick a spot on the haulage road. Every three minutes one of the Harmattan Mine's ten 40-ton coal haulers passes the spot on the way to the preparation plant. These coal haulers have used STANOLUBE HD-M Motor Oil for ten years for these reasons:

Product: STANOLUBE HD-M Motor Oil is refined from the highest quality base stock. Blended into this carefully refined base oil are additives that retard oxidation, minimize piston ring deposit formation and prevent the forming of excessive varnish and sludge. Other additives prevent corrosion of bearing metals and eliminate bronze wrist-pin bushing corrosion.

Technical Service: Fred Barnes, who has 22 years' experience providing lubrication technical service at Standard Oil, calls on Harmattan Mine. He lives at Decatur, only

Harmattan Mine truck foreman Ralph Westfall and Standard's Fred Barnes inspect coal hauler piston. Prior to his 22 years' service providing technical assistance on lubrication problems, Fred Barnes attended James Millikin University. He has also completed the Standard Oil Sales Engineering School.

80 miles from the mine. Fred is on call at any time to get to the mine and render assistance on any problem involving lubrication engineering.

Deliveries: A Standard Oil agent located only five miles from the mine delivers lubricating oil, is handy for regular deliveries and for special deliveries at a moment's notice. The mine management never needs to worry about inventories of STANOLUBE HD-M. Their Standard Oil agent takes care of that.

Would you like this kind of service for your coal mining equipment? It's at your doorstep anywhere in the 15 Midwest or Rocky Mountain states. Call your nearby Standard Oil office. Or contact by letter, wire or telephone: **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

One of the biggest draglines ever built is this Bucyrus-Erie unit. It is one of two in service at Harmattan Mine. Both are Standard Oil lubricated.

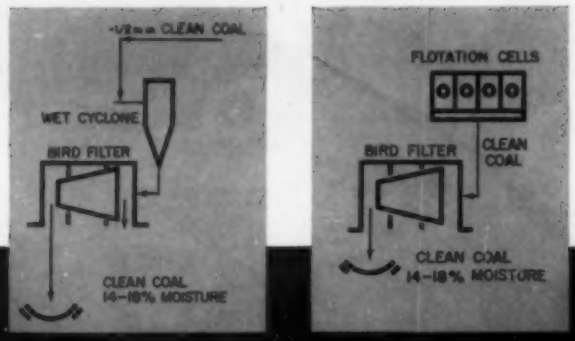
Every three minutes one of these 40-ton coal haulers moves down haulage road to preparation plant. STANOLUBE HD-M Motor Oil stands up to the tough service imposed on it. Dirt, adverse road conditions, hot engine operation and heavy-load—no-load service cannot lick this oil.

Quick facts about

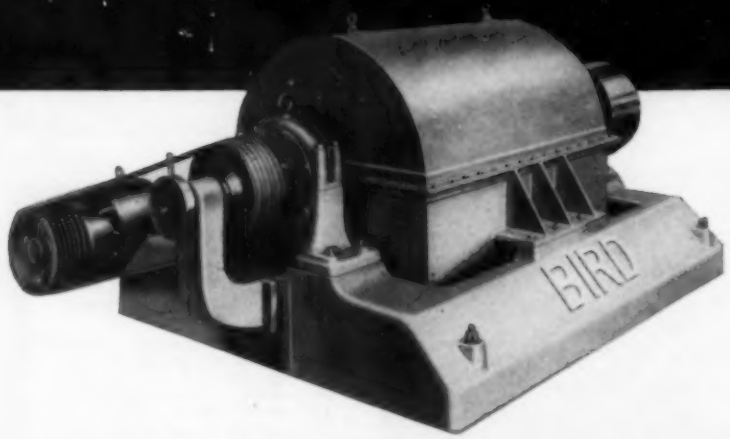
STANOLUBE HD-M Motor Oil

- Refined from highest-quality base stock.
- Contains special additives that prevent bearing and bronze wrist-pin bushing corrosion, reduce piston ring varnish and keep rings free to seal against blow-by.
- Contains still other additives that reduce wear on heavily stressed parts.

You expect more from **STANDARD** *and you get it!*



What do YOU do with your Minus ½mm Coal?



Whether it comes from flotation cells or cyclones, the Bird Solid Bowl Centrifugal Polisher is the most effective, most economical way to dewater it.

Fed from the cells or the cyclones, the Bird Polisher gets the ½mm fines drier than by any other mechanical means, thus avoiding a heavy and costly load on the thermal drying system. Operating cost including write-off is only five cents or less per ton. Maintenance averages 2 cents or less per ton.

Ask us to show you how this Bird Polisher fits into your system and how much it will save.

BIRD SOLID BOWL *Centrifugal* POLISHER

BIRD
MACHINE COMPANY

SOUTH WALPOLE, MASSACHUSETTS

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BIRD MACHINE'S 50th YEAR OF SERVICE TO INDUSTRY

This Month in COAL AGE

OCTOBER 1959

Features This Month:

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More Coal-Based Power in the West ..... p 74

Raw-Coal Quality Control Pays Off for M&O .... p 80

Helicopter Saves Executives' Time, Results in Better Supervision ..... p 86

Maintenance Ideas ..... p 90

- **Preventive Maintenance for Diesel Engines**
- **Selection and Use of Electrical Instruments**
- **How to Apply and Service Mercury Switches**

Central Circuit-Scanning System Monitors and Controls Outlying Units ..... p 102

Coal Research and Techniques In Communist China ..... p 110

Flexibility, Efficiency, Economy Mark Kocher Heavy-Media Plant ..... p 114

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Foremen's Forum p 132 — **Operating Ideas** .. p 138

Equipment Developments ... p 144

► Regional Development

More Coal-Based Power in the West ..... p 74

Pacific Power & Light Co. recently opened a new large power generation project at Glenrock,Wyo., using a massive deposit of subbituminous coal as source of energy. The power is fed into a power pool serving the mountain states. Known as the Dave Johnston plant, the new facility consists now of one 100,000-kw generating unit with a twin unit under construction. Four such units are envisioned in the entire project.

Major Emphasis——Stripping a 30-ft seam; building a haulage road for 70-ton coal haulers.

► Merchandising

Raw Coal Quality Pays Off for M & O .... p 80

W. A. Raleigh Jr., Associate Editor, *Coal Age*

Selling coals comparable to big-preparation plant quality at 40c less per ton has been achieved by the M & O Coal Co., Clarksburg, W. Va. The firm's merchandising plan is based on mine-to-market control of raw coal quality. Plan components include field sampling and blending, double picking and crushing at the tipple, and a daily analytical program conducted by the Commercial Testing & Engineering Co.

Pictured—Field and car sampling; tipple operation; lab quality records.

► Executive Transportation

Helicopter Saves Executives' Time, Results in Better Supervision ..... p 86

A new sight in the sky over the Clearfield, Pa. area is the coal industry's first executive helicopter. Owned by the Shawville Coal Co. and also serving the Lingle Coal Co., B & R Equipment-Supply Co. and the River Valley Construction Co., the three-passenger Bell 47G2 helicopter makes it possible for executives to visit 14 different centers of activity in 2 hr 45 min. Within 3 min of the time the helicopter leaves the Shawville heliport supervisors can be at any of the operations. If it has a good, clear approach, only a 10x10-ft bearing area is needed for it to rest on. To clear the rotor blade requires a 50-ft-diameter circle. The helicopter also proves itself extremely valuable when purchases or leases of coal lands are being considered.

Bonus—Typical daily flight report.

► Maintenance Ideas

A Preventive Maintenance Program for Your Diesel Engines ..... p 90

A full-scale roundup of preventive maintenance measures for diesel engines, prepared by the Service Promotion Dept., Detroit Diesel Engine Div., General Motors Corp., offers a program based on the performance of specific service functions and accurate record keeping.

Bonus—Samples of four maintenance record forms to help you get the program underway.

Selection and Use of Electrical Instruments p 93

Electrical instruments are used to measure voltage, current, power, power factor, etc., to let you know what is going on inside your motors, transformers, cables and other equipment. Tips on the selection, use and care of these instruments will enable you to get more

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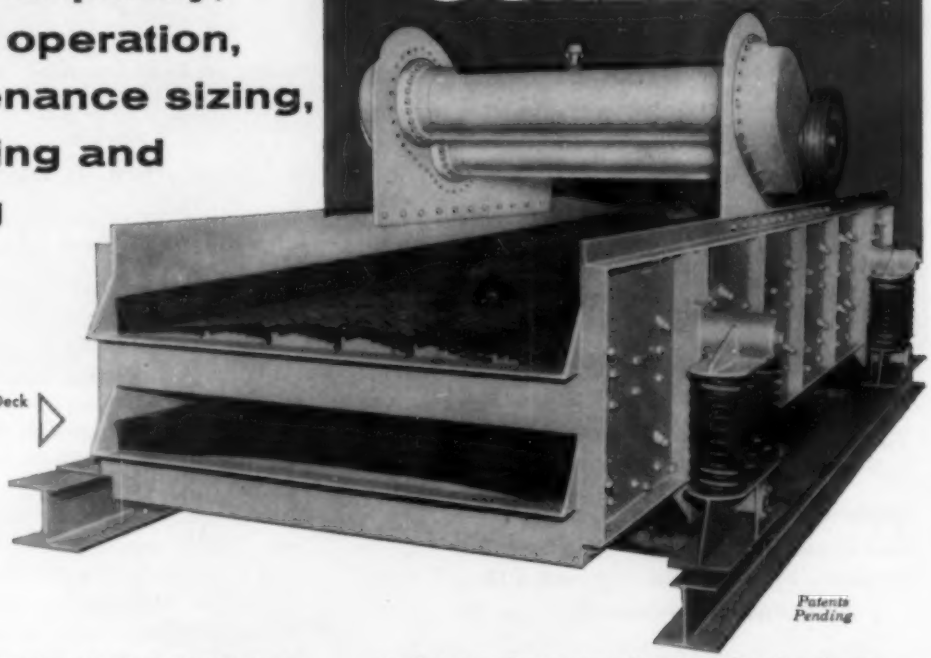
LECCO VIB

HORIZONTAL VIBRATING SCREENS

for high-capacity, non-stop operation, low-maintenance sizing, dewatering and conveying



6' x 16' Double Deck
Model 02-24

Patents Pending

When a Lecco Vib Horizontal Vibrating Screen is on the job, you know you're getting accurate performance under a wide range of operating conditions whether screening from the coarsest to the finest feeds. That's because the Lecco Vib Horizontal Vibrating Screen is designed and built with superior construction which eliminates adjustment and maintenance slowdowns and stoppages. Each recommended Lecco Vib receives personal attention to screening requirement based on proven methods of calculations.

The new Lecco Vib Horizontal Vibrating Screen literally abounds with exclusive features that make it the economical standout of screening equipment for the modern preparation plant, both as to performance and maintenance requirements.

To assure non-stop operation continuously, the Lecco Vib Screen is *base mounted* or cable suspended, when required, without loss of the dampened start and stop control. Thus, vibration is confined entirely to the vibrated frame and not transmitted to the supporting structure and other equipment.

Vibration absorption is pin-pointed to the coil springs installed at each corner of the unit to support the vibrated frame on its base. Friction checks are provided to eliminate erratic motions of the Screen when starting and stopping. Heavy duty plates of the decks are ribbed and stiffened to withstand the abuse of heavy high-capacity loads and vibration.

Exclusive adjustable trunnions position the coil springs of the Lecco Vib to the desired angle of material flow.

Then too, special feed boxes, which allow full advantage of total screening area are built into the side plates of the Screen as an integral part of the main frame.

For complete information about the Lecco Vib Horizontal Vibrating Screen write for your copy of Bulletin L-12-59.

Lecco Machinery and Engineering Co.

BLUEFIELD, WEST VIRGINIA

Subsidiary Fairmont Machinery Company

accurate readings and longer service from your instruments.

And in Addition —Diagrams show how various instruments are connected in circuits.

How to Apply and Service Mercury Switches p 96

What are mercury switches? How do they operate? Why are they used on mining machines? How do you take care of them? These questions, and others, are answered in this article to give you a better understanding of these small DC-control devices.

Extra—How to make your own mercury-switch tester.

► Electrical Controls

Central Circuit-Scanning System Monitors and Controls Outlying Units . . p 102

W. G. Kegel, General Master Mechanic, Vesta-Shannopin Coal Div., Jones & Laughlin Steel Corp., California, Pa.

Positive, automatic and continuous monitoring and control of outlying substations and fans is achieved with a central circuit-scanning system at Jones & Laughlin's Vesta No. 5 mine. The system simulates the old reliable methods of two-wire direct voltage operation and its circuits are readily understood by J & L employees. Other advantages include low-voltage DC operation which does not interfere with any other control and trouble-free operation in an area subject to severe electrical storms.

Of Prime Interest—What the system is; how the scanner works.

► Red China

Coal Research and Techniques in Communist China . . . . . p 110

K. P. Wang, Far East Specialist, Div. of Foreign Activities, U. S. Bureau of Mines, Washington, D. C.

Red China expects to produce 335 million metric tons of coal in 1959, as against 270 million tons in 1958. Approximately 56% of 1958 production was from efficiently-operated large mines and the remainder from small operations worked by communes and local groups. Basic objectives now are to accelerate development of large mines and consolidate smaller ones. Research and education in coal utilization and mining techniques are being expanded. Hydraulic mining is getting a big play. Low- and high-temperature coal-carbonization methods also are under active investigation.

High Spots—List of China's biggest mines, and description of shafts without headframes.

(*Continued on p 9*)

This Month in COAL

405 OR BETTER?—Though the final figures probably will be higher, this preliminary total for bituminous for 1958 looks very much as if it could also be the one for 1959. Bituminous ended the first 9 mo practically even with 1958, and the outlook is for the same pattern in the 4th quarter, which would put the 1959 preliminary, like that of 1958, at 405 million. Some, however, feel that bituminous can do better but the majority leans to a more-conservative view on the basis of an analysis of possibilities in the major markets:

Steel—The automobile industry plans a heavy schedule on 1960 models and there will be rebuilding of depleted steel inventories elsewhere. This means an active period for steel in the months ahead but not necessarily a higher average level than in the booming prestrike period. Consequently, though the conservative view is that the call for raw materials, including coal, will not markedly exceed the prestrike level a greater-than-expected resurgence could boost the total significantly.

General Industry—No particular change is apparent in the pattern of materials use and thus no particular change in the demand level.

Electric Utilities—Aided by the boom in air conditioning the electric utilities reached a new generating peak of over 14 billion kwhr the week ended Aug. 22 in spite of the steel strike. Prospects are that it can do even better in some weeks in the 4th quarter.

Other Markets — Household and exports demands continue to drop and recovery to previous levels is not expected in the last quarter.

Competition—Though 1960 may be another story competitive pressure has not been appreciably greater in 1959 and coal has been able to hold its own and even gain in some areas to offset inroads into other markets —domestic, for example. Among the gains were increased ordering by Atlantic Seaboard utilities in anticipation of approval of the 50c freight cut for volume business.

Adding It Up—Balancing the pluses and minuses on the basis of a look at each of coal's markets leads to the conclusion that an average 9-million-a-week rate in the last quarter and 405 million for 1959 is a reasonable expectation. If some increase could be looked for—and this is not out of the question, depending on how fast steel and general industry pick up—the total could be several million tons more.

GOVERNMENT AND COAL—The end of the 1st session of the 86th Congress left coal still without certain relief it has been seeking. A resolution directing the development of a National Fuels Policy was tabled in the House. Legislation for specific oil-import quotas got nowhere. The coal-research bill was vetoed on administrative grounds, but presumably will be altered to meet the objections in the next session.

On the plus side oil imports were brought under control, though pressure to relax and to make exceptions was growing. So, for these and other reasons, coal now of necessity looks to the next session.

ROOF BOLTING THAT INCREASES PRODUCTION

The ACME Model HSJ-4WD Jumbolter can work an area 23′ 10″ wide without moving. The air-articulated arms reach out 9′ in front of the machine. Each arm operates independently and swings 270 degrees.

with ACME 4 WHEEL DRIVE A.C. or D.C. JUMBOLTER

The versatile ACME Model HSJ-4WD Jumbolter, equipped with tractor-type 4 WHEEL DRIVE, insures minimum turning radius. Left hand and right hand wheels are integrated units. By reversing the wheels on one side while driving forward on the other side the ACME JUMBOLTER will turn in its own approximate diagonal.

This unit, now successfully operating under a variety of conditions, permits bolting in a wide flexible pattern from 8 to 10 feet back of the working face.

An Easy Way to SAVE DOLLARS on Your Air Supply

ACME'S new dust collector shut-off valve stops the operation of the dust collector when the stopers are idle between steel changes, etc. Controlled from the throttle valve of the stoper this simple, mechanical, fully automatic valve synchronizes the operation of the drill and the dust collector. It can be easily installed on your present Le Roi dust collecting system and will substantially lower operator fatigue by eliminating unnecessary dust collector noise. Designated the Model APC-77, the valve is modest in cost.

ACME MACHINERY COMPANY

ACME MACHINERY COMPANY

HUNTINGTON, WEST VIRGINIA

WAREHOUSE AND SALES OFFICE
MORGANTOWN, W. VA.

REPRESENTATIVES IN PRINCIPAL MINING AREAS

► Coal Preparation

Flexibility, Efficiency, Economy Mark Kocher Heavy-Media Plant ....p 114

Kocher Coal Co.'s new heavy-media plant, employing a drum separator as the washing vessel, is equipped with an adjustable crusher for adjusting size consist of plant yield to meet fluctuating demand for various sizes. Storage of raw coal, rough-cleaned coal and clean coal provides maximum flexibility in servicing truck customers. Finer sizes are cleaned on double- and single-deck coal washing tables.

Idea Bank—Welding taps throughout plant; clean, easy magnetite charging and handling.

Foremen's Forum .....p 132

Look for opportunities to get favorable publicity for employees and company, especially locally.

Operating Ideas .....p 138

Modernizing motors with new ball bearings; longer life from carbide bits; entry profiles by camera.

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This Month in Mining Practice

CUTTING DRYING COST — Perhaps there never will be really low-cost heat drying of coal, particularly fines, in the sense that it can be done for a few cents, but it is a fair guess that the minimum is yet to be reached. New types of units are still being developed, among them, in addition to fluidized-bed equipment, a modification of the rotary kiln, which was the first to be used on any scale at coal mines in the U.S.A. Design which permits outdoor operation and a much simplified and more-efficient firing system makes this new unit, along with others, a lower-cost machine all around.

MEETINGS SEASON — The months of October, November and December of this year will be marked by the holding of more than 20 meetings, symposiums, conferences and the like on coal mining, coal utilization and related subjects, including, of course, the vital one of safety—in itself the "raison de etre" of one conference of a week involving representatives from a number of foreign countries in addition to the U. S. This year, inspection of the programs so far available shows the quality of the papers and discussion will be more than ordinarily high, and consequently the mining man will be much more likely to be well repaid for his attendance time.

COAL FOR SUPPORT—Reports from McGraw-Hill correspondents around the world include a recent one dealing with Russian tests of plastic props. So far, no conclusions have been reached as to how they compare with wood and other support materials. In the U. S., as a sidelight on the work and investigations being carried on, it is being shown once again that top coal left undisturbed is one of the best roof preservers there is. When reinforced, as it should be, by supplementary supports of the proper type, it is, when available, hard to beat.

COAL WASHING TOO—Replacement of face and pit units is taken as a matter of course when new and more-efficient equipment becomes available. So far, perhaps because there is inherently less opportunity for making advances, this has not been the rule with coal washers of the modern type (those installed since the 30s, including heavy-medium). Now, however, it appears that a trend toward rebuilding, extending or even downright replacement may be developing to attain higher efficiency, more automatic operation, lower maintenance and the like, including higher throughput. The trend—if such it can be called—is evident even with heavy-medium units installed not much over 5 yr ago.

NEW TESTS FOR CABLES?—Cables for mining equipment are subjected to a wide variety of tests during and after manufacture. One is the Pennsylvania flame test developed to get some indication of a cable's resistence to ignition and flame propagation. It is accepted as a good test but there is a feeling that a better one might be developed. Whether this actually will come about still is a question, but some work has been done and more probably will follow. One result will be still further improvement in cable quality.

THE SPLICE OF LIFE

When you splice and reinsulate with Uskorona® and re-jacket with "D.R." splicing compound, you renew the life of the cable. *The entire splice will last as long as the cable.*

These entirely reliable tapes are:

- Extra-tight gripping, plus high in tensile strength.
- Resistant to acid, alkalies and moisture ... ideal for use on mining machine cables.
- Impossible to pinhole, so dangerous leaks can't occur.
- Absolutely waterproof.

Uskorona exceeds A.S.T.M. specifications and can handle a wide range of electrical and general purpose jobs in mines. A complete line of mine tapes is available.

• • •

When you think of rubber, think of your "U. S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

US RUBBER

USKORONA SPLICING TAPE

ABOVE GROUND. When spliced with Uskorona and "D.R." tapes, cables become perfect again. These splices restore the mechanical and dielectric quality of the cable, resist severe abrasion and exposure to moisture.

BELOW GROUND. Being run over by cable cars in coal mine can't hurt Uskorona splices protected by "D.R." splicing compound. They take this punishment many times a day.

US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

The Coal Commentator

Still One-Sixth

Perhaps the best gage available of the extent of nonunion production is the vacation shutdown tonnage. This year it was 1,520,000 tons for the week ended July 11 or, assuming that the normal rate at this period should be 9,000,000 a week, one-sixth of the total.

In the 10 yr starting with 1950 and ending with 1959, the total for the vacation never has dropped below 1,128,000 tons (in 1952), while the peak was 2,217,000 tons in 1955. With these exceptions the totals varied from 1,300,000 to 1,600,000 in this 10-yr period.

Since 1956 the tonnage in the shutdown week has been showing a tendency to creep up, marking once again the staying power of the nonunion property—usually one producing less than 50,000 a year. Such properties, some of which also are in the union group, as pointed out, also are accounting for more of the total output.

Keep Open

All the way from indicators and controllers using radioisotopes to plastic tape will be the span of this little dissertation, aimed at emphasizing the benefits of keeping the mind open to new ideas.

Want to hang heavy rubber cable with a low-cost suspension that also is easy on the jacket? Use plastic tape rather than wire. This practice has cut trouble sharply at a number of mines and becomes one of that big group of relatively simple ideas that in total represent a major saving in cost, and leads to the conclusion that some skull sessions on these simpler problems can be most productive.

For such things as determining the solids content of material flowing in a pipe to, say, a flotation plant; for registering bin levels and controlling feed and withdrawal; and for other operations around coal mines, new instruments employing radioisotopes are compiling some real records of benefits. But radioisotopes tend to bring up visions of the more lethal aspects of the use of nuclear materials, even though the hazards associated with the use of such instruments are, for all practical purposes, nil. **Since such equipment can perform certain operations more effectively and at less cost, rejection without investigation can result in missing a real opportunity.**

Well Done

Ed Johnson is a name known far and wide in coal mining, since he has served with unfailing distinction in a variety of capacities. One of the first men your commentator encountered in the early days of his more than 30 yr on *Coal Age* was Ed Johnson. He impressed then with his knowledge, his evident desire to advance the welfare of the coal industry and his downright humanness in his relations with his fellow men. That impression has deepened with the years.

So, as he relinquishes his responsibilities as manager of the Mining Tools Div. of Kennametal, Inc., it is easy to join with those who will miss his contributions but who also wish him every happiness in the years to come.

Solid Still

"Engineering contracts for a new blast furnace at the Cleveland Works of Jones & Laughlin Steel Corp.—the largest ever constructed in the steel industry—have been awarded to Arthur G. McKee & Co., of Cleveland, it was announced today [Aug. 25] by J. R. Powell, works manager." In view of the material that has been appearing in the public prints, including *Coal Age*, in recent months on substitutes for the blast furnace, generally known as the "direct-reduction" processes, this announcement is of unusual interest not only to steel producers but coal producers as well.

The conclusion is that the blast furnace is not even close to being outmoded. In addition, other reports indicate that the steel companies may use less scrap and more pig in the future, thus offsetting in part the reductions being achieved in the coke rate. On all scores the smelting of iron ore is still solid on coke and in turn coal.

New, Yet Old

The fact that most of the basic ideas for the machines of today are old and that the new label is possible only because of advances in materials, metals and design is constantly being highlighted by the turning up of old units. Robert L. Anderson, of the Bureau of Mines, for example, recently reported on a visit to central Pennsylvania during which he inspected a "Walker-Caldwell" machine built in 1912 and found in the old workings of the Imperial Cardiff mine in 1943 by the Pabrazinsky brothers. John, now superintendent of No. 1, has the machine on exhibit in his backyard. One reason it failed apparently was lack of means to get the coal away.

Because of advances along the lines previously noted the miners of today work and work well, though here again they are not the universal answer to all problems of getting coal out of the solid. Under certain conditions the conventional units often can hold their own—and will continue to do so for some time as they also are improved and thus make the necessary operating labor more productive.

"Spotty, as a digger, you just ain't got it!"

Without realizing it, Billy has hit upon a basic truth in the excavating business. To come out on top, you've got to use the best equipment for the job.

With many factors beyond a contractor's control, choosing the right equipment becomes especially important. For this is one thing a man *can* control.

That's why so many contractors choose Bucyrus-Erie. They have learned . . . as their fathers did before them . . . that B-E machines are built for more than ordinary digging. They are built to handle the toughest jobs — and still perform better.

BUCYRUS ERIE

Flame tests prove fire-resistant properties of this hydraulic fluid

Photos: courtesy U. S. Bureau of Mines

First low-cost fire-resistant mine fluid!

SHELL 3XF MINE FLUID HAS BEEN TESTED BY U.S. BUREAU OF MINES AND IS NOW IN USE

Now—for the first time in mining history—an inexpensive, fire-resistant emulsion-type hydraulic fluid is available for mine equipment use—3XF* Mine Fluid.

No major modification of equipment is necessary—Shell 3XF is a direct replacement for ordinary hydraulic oils now in service.

Convenient to use—Shell 3XF Mine Fluid, furnished as a concentrate, is mixed with water to prepare the emulsion *at the mine location.*

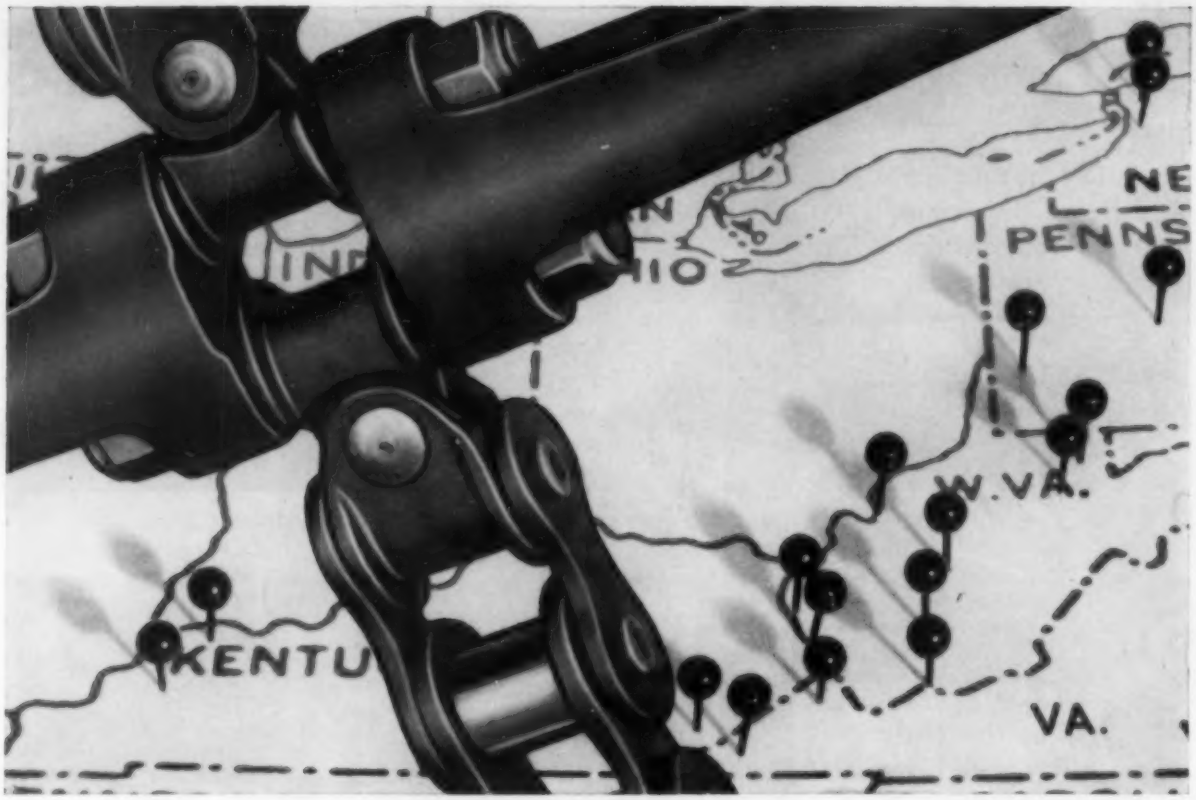
Proof of its fire-resistant qualities—In addition to recommending the use of fire-resistant hydraulic fluids in mining machinery, the Bureau of Mines has evaluated 3XF Mine Fluid using test methods that determine fire-resistant properties, and accepted it for mine evaluation, pending the establishment of a Bureau approval schedule.

For complete information on 3XF Mine Fluid, write or call Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California. In Canada: Shell Oil Company of Canada, Limited, 505 University Avenue, Toronto 2, Ontario.

*Trademark

SHELL 3XF MINE FLUID

SHELL



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Whitney Chain distributors are located in key cities throughout all the mining areas. All Whitney distributors carry full stocks of exclusive design Whitney Mine Chain and American Standard power transmission chain. Backed by years of experience, your local Whitney man is a mighty good man to know. He's ready, willing *and able* to service your particular chain needs . . . quickly and economically.

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- Detachable flight design prolongs service life. Accurate tapered stud fits solidly as one unit, anchors flight, obsoletes shoulder pins. Quick, easy adjustments or replacement at the face or shop permitted by threaded stud with self-sealing locknuts. Allows you to *salvage flights* from your old chain for more service . . . *more dollar savings!*
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- Whitney mine chain offers you the design advantages and simple maintenance of either riveted or cottered type chain.

Whitney manufactures the entire product — both chain and flights — to assure complete balanced design, and a fast, complete customer service. Catalogs on request.

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A Subsidiary of Foote Bros. Gear and Machine Corporation

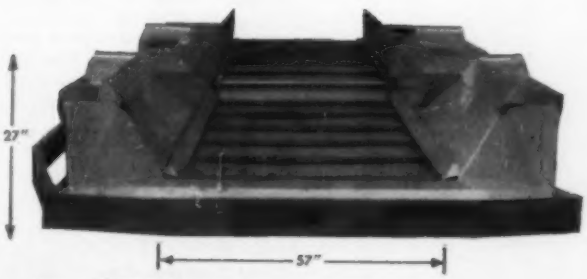
Low and wide, with Big Car performance

New Goodman type 870-20 low vein shuttle car

This *low, wide* car combines a big payload and ease of handling with all the structural strength expected only in big cars. Its capacity means fewer car changes per cut, lower elapsed loading time, more production per shift. Four-wheel power steering, 4-wheel power brakes, and 4-wheel drive provide ease of handling . . . reduce operator fatigue . . . promote safety.

As for strength—wheel units, conveyor chain, gear reducers and electrical control parts are the same as found in big cars, some even interchangeable. Frame and side plates are welded in a rigid one-piece unit reinforced with heavy cross-members. You don't have to worry about cracks or bends under severe conditions.

Make your low coal operation pay off. Team the big car performance and strength of the 870-20 (DC or AC) with the new Goodman 964 low vein loader. Get the full story from your Goodman sales engineer.



Low—27" height.
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3½ to 4 ton capacity

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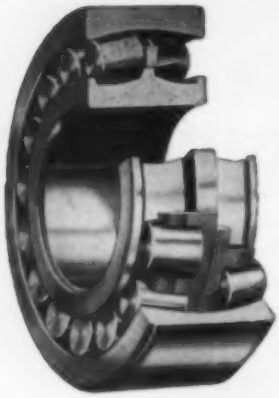
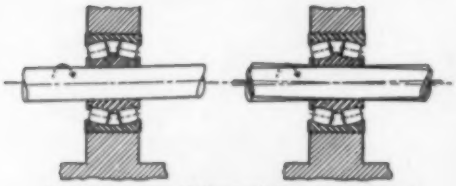
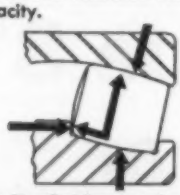


WHY TORRINGTON SPHERICAL ROLLER BEARINGS

mean superior performance, longer life

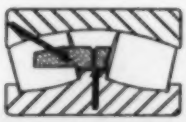


Self-Aligning Spherical Design allows compensation *within* the bearing for initial or dynamic misalignment up to 1½° in either direction and still maintains full radial and thrust capacity.

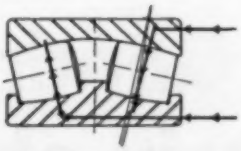


Positive Roller Guidance is doubly assured by the Torrington design: 1. Approaches the design of a true rolling cone. 2. Under load, the spherical roller seeks positive contact with the center guide flange because of its basically conical shape. This assures geometric stability, accurate guidance, lower friction and truer rolling.

Conformity of Precision-Ground Races to Rollers gives maximum load capacity and even load distribution. Optimum conformity of roller end to center guide flange prevents skewing.



Land-Riding Bronze Retainers, fully machined, operate with minimum friction. Each row of rollers operates independently under thrust loads without drag or side pressure from adjacent row.



Takes Thrust Loads. Angular design effectively handles end thrust due to load conditions, misalignment or other causes.

These are only a few of the features of Torrington Spherical Roller Bearings that make them your best buy for replacement needs. And for fast service, turn to your *Authorized* Torrington Bearing Distributor. He maintains complete stocks of Torrington bearings and can advise you on the latest installation and maintenance procedures. THE TORRINGTON COMPANY, South Bend 21, Ind.—and Torrington, Conn. District offices and distributors in principal cities of United States and Canada.

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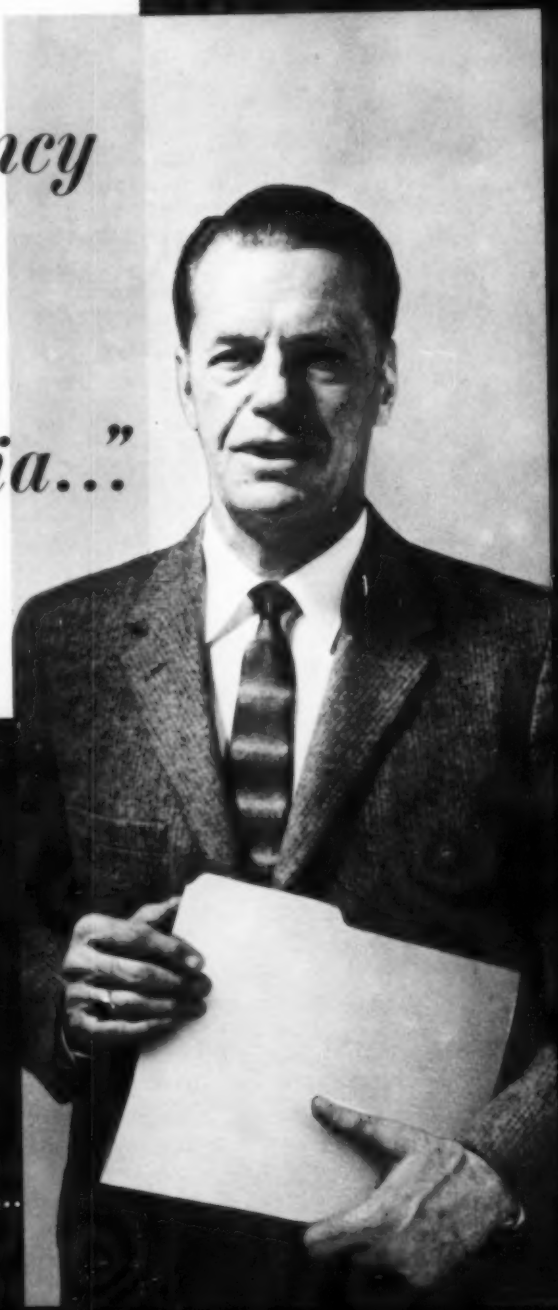
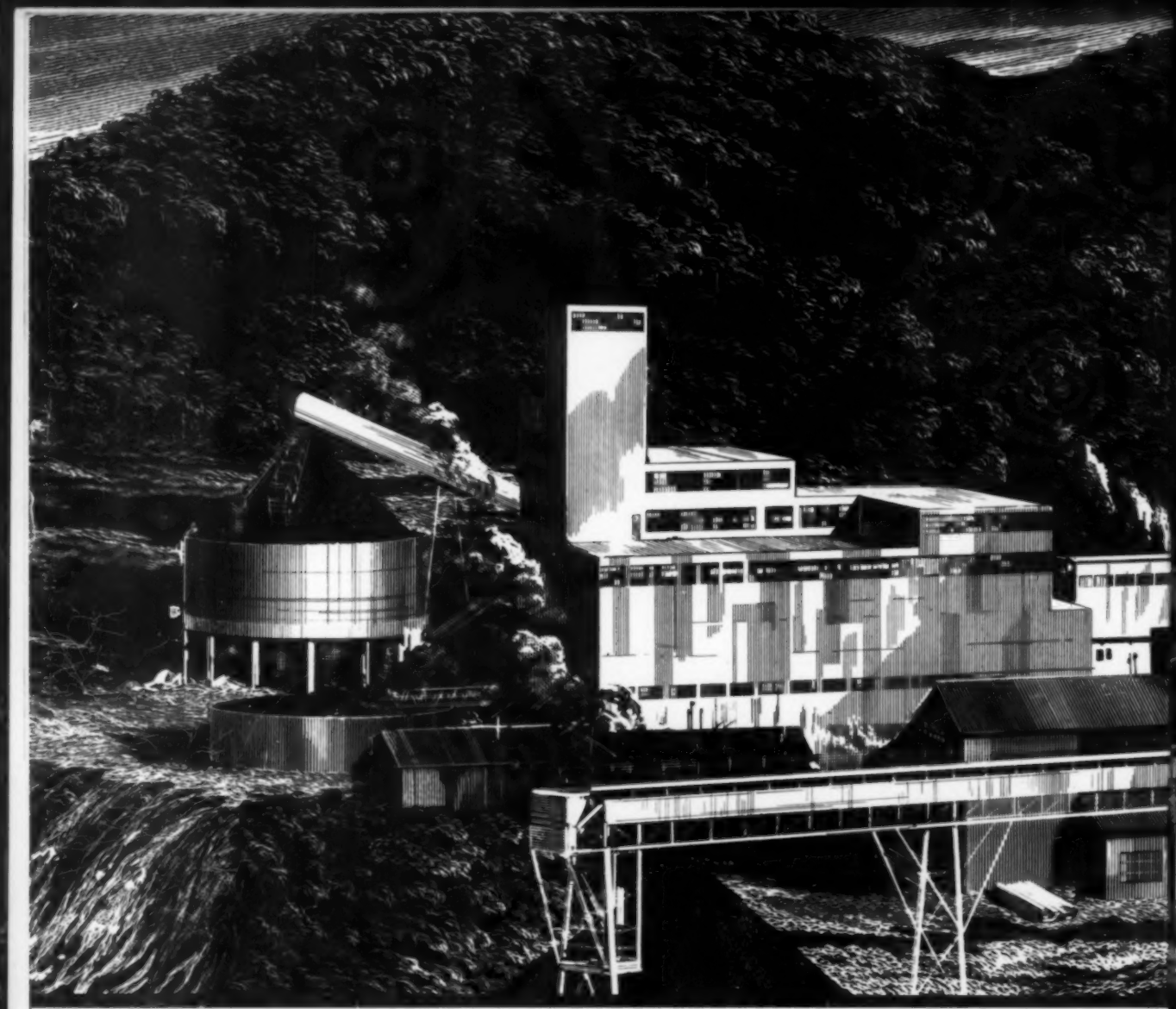
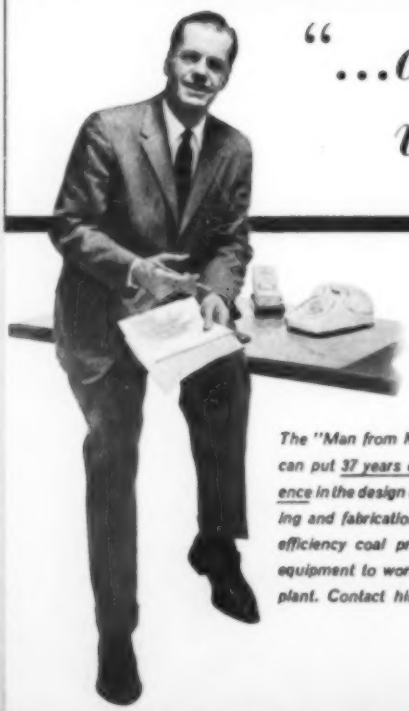
"McNally plant sets new efficiency standards in Australia..."



This month's report from the "Man from McNally" tells about the performance of another McNally Pittsburg Preparation Plant "down under" in Australia



"...delivers top tonnage with minimum maintenance"



The "Man from McNally" can put 37 years of experience in the design engineering and fabrication of high efficiency coal preparation equipment to work in your plant. Contact him today!

This highly efficient Coal Cliff Collieries, Ltd., plant was designed in collaboration with, and erected by, our co-manufacturer, A. E. Goodwin Ltd., of Sydney, Australia. It takes R.O.M. and reduces it to 5" and under, via a McNally Rotary Breaker, from a 1000-ton stockpile. This raw coal feed is delivered to a McNally Norton Washer at 400 tph with 1" minus middlings diverted directly to the refuse bin. The washed and dewatered 5" x ¼" coal is then discharged into two McNally Tromp Dense Media Washers for reseparation at lower specific gravity.

The ¼" x 0 material is then sent to two McNally Fine Coal Washers for further separation. A selected portion of the middlings, plus cleaned ¼" x 0, after desliming on a vibrating screen, is then distributed to four centrifugal dryers. Production to date has been up to all expectations . . . with maintenance throughout the plant at an absolute minimum.

ASK THE MEN WHO KNOW COAL FROM THE GROUND UP

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

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Find out for yourself just how much you can improve your plant efficiency and profits with McNally Pittsburg coal preparation equipment.

Gentlemen:

Please send me information about the following equipment:

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- ☐ Heavy-duty Equipment ☐ Coal Cleaning
- ☐ Thermal Dryers ☐ Centrifugal Dryers
- ☐ Crushers ☐ Conveyors

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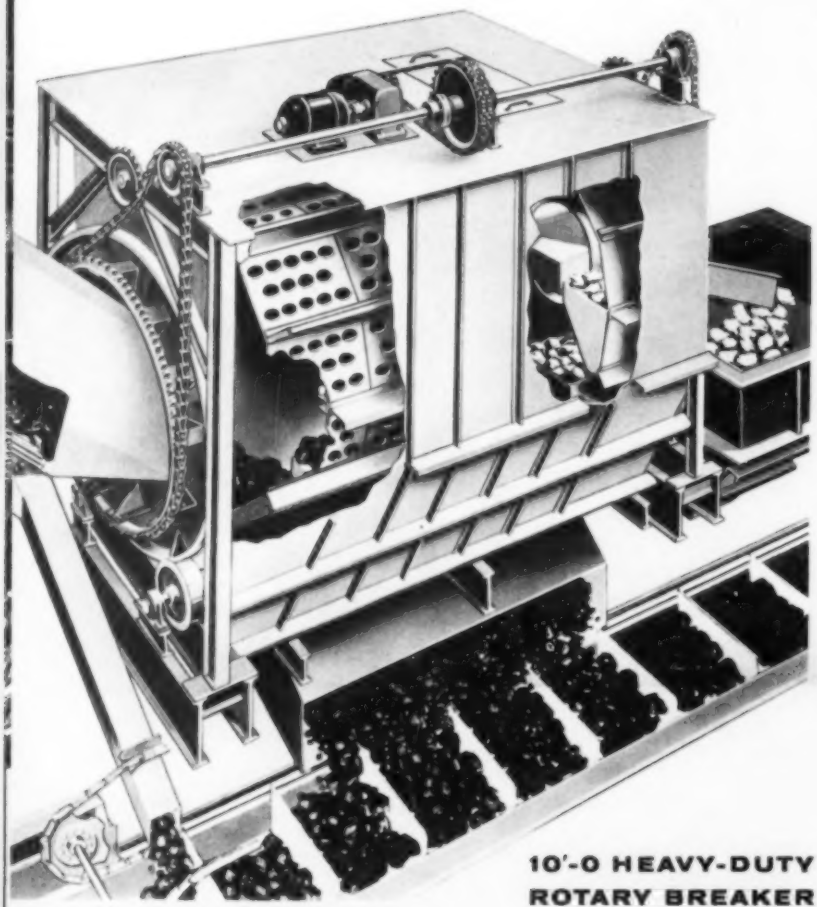
CITY_____ STATE_____

C

McNALLY HEAVY-DUTY ROTARY BREAKER

gives positive control of top size
in run-of-mine feed coal preparation



10'-0 HEAVY-DUTY
ROTARY BREAKER

The outstanding performance records of this McNally breaker are a result of its unique design. Positive control of the top size in preparing R.O.M. washing feed eliminates picking table circuit. Trouble-free operation with rock-bottom maintenance of these rotary breakers results from the omission of the center shaft and spoke interference —with the breakers riding on trunnions instead, using only gravity as the breaking force. Also heavy cast alloy steel breaker plates increase life, reduce maintenance.

Trunnion rollers have self-aligning antifriction roller bearings—another low maintenance design feature.

If you would like recommendations on the exact rotary breaker for your needs —contact the McNally engineering department, without cost or obligation.

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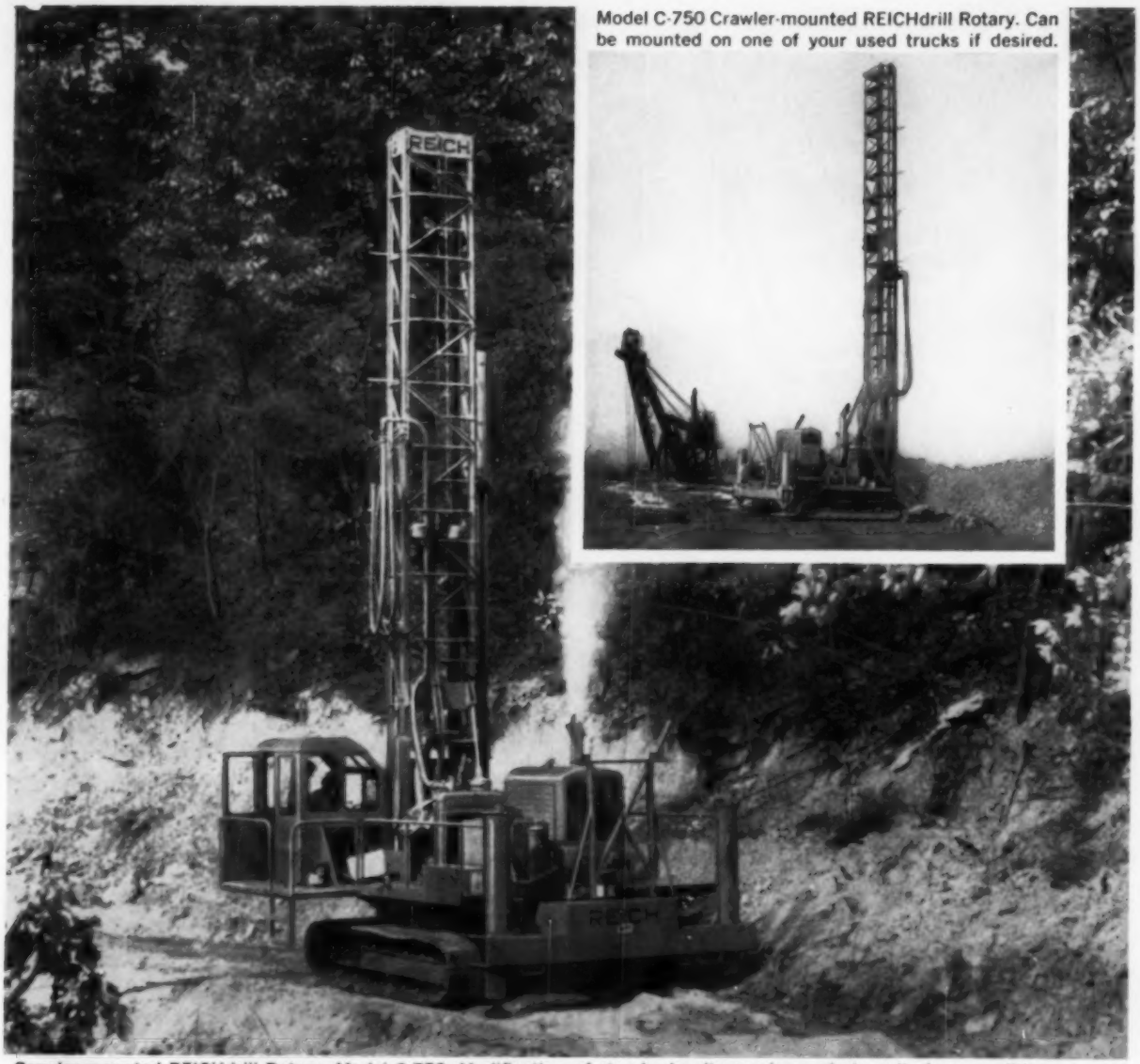

Model C-750 Crawler-mounted REICHdrill Rotary. Can be mounted on one of your used trucks if desired.

Crawler-mounted REICHdrill Rotary, Model C-750. Modification of standard units can be made to suit given conditions.

IN THE COAL FIELDS
REICHdrills GIVE YOU MUCH MORE HOLE PER DAY

And here are 4 rugged reasons why:

1. Variable rotation speed gives you exactly the right RPM for any material, rock to rubble.

2. Minimum of control levers for all operations means fast, easy handling by one man.

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4. Extra heavy-duty construction on all component parts, including pumps, gears and frame means rig can take long, high speed duty without costly maintenance. Plus other field-proven features like hydraulic stem loader and down-the-hole hammer.

Units can be supplied truck or crawler-mounted to suit operating conditions. Holes up to 12″ diam. Down pressure to 75,000 lbs. Write for detailed information on REICHdrills.

REICHdrill *Division: Chicago Pneumatic Tool Company*

1439 ASH STREET, TERRE HAUTE, INDIANA

Lima Type 2400 with 120' boom and 6½-cu. yd. bucket owned by Miller & McKnight Coal Co., Slippery Rock, Pa., working near Harlansburg, Pa.

Big output, Low maintenance is story of LIMA Type 2400 on rugged stripping operation

"Our Lima 2400 does more work and costs less to maintain than other makes of similar capacity." That is what Calvin McKnight, Miller & McKnight Coal Company partner, says about the Lima Type 2400.

Moves more dirt

"Maintenance certainly hasn't been any problem. Hardly any downtime to speak of. Fact is, we figure that in about 6000 hours of rugged stripping operations, maintenance and parts costs have amounted to less than $300. Or less than a nickel an hour!

"Our 2400 moves more dirt than any machine I know of around here. And it is built better, too. Clutches and brakes—all are extra big—last longer. They're made to take it. Seems as if you just can't wear a Lima out!"

Standard Lima Type 2400 is a convertible 6-cu. yd. shovel, 110-ton crane and variable capacity dragline. Longer booms and handles can be added for high lift shovel work. Built throughout for heavy duty service where big production, rugged power and low operating cost are vital.

Faster swing motion

The 2400 is a full mechanical clutch machine with all major operations accomplished by air actuated clutches. Diesel engine equipped with torque converter to reduce shock loading and eliminate engine stall. Converter gives operator smoother, more accurate control of all operations.

No matter what your job requirements, if it calls for high performance at low cost, there's a Lima type and size exactly right for you. Cranes to 110 tons, shovels ½ to 6 cu. yd., draglines variable. Choice of mountings and power plants. Get more information now. See your Lima distributor or write to us.

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LIMA Construction Equipment Division, Lima, Ohio

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Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

592

TAKES OFF ITS HAT TO NOBODY!

Carriage, lag and machine bolts.
All sizes. Quick delivery from stock.

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BETHLEHEM STEEL

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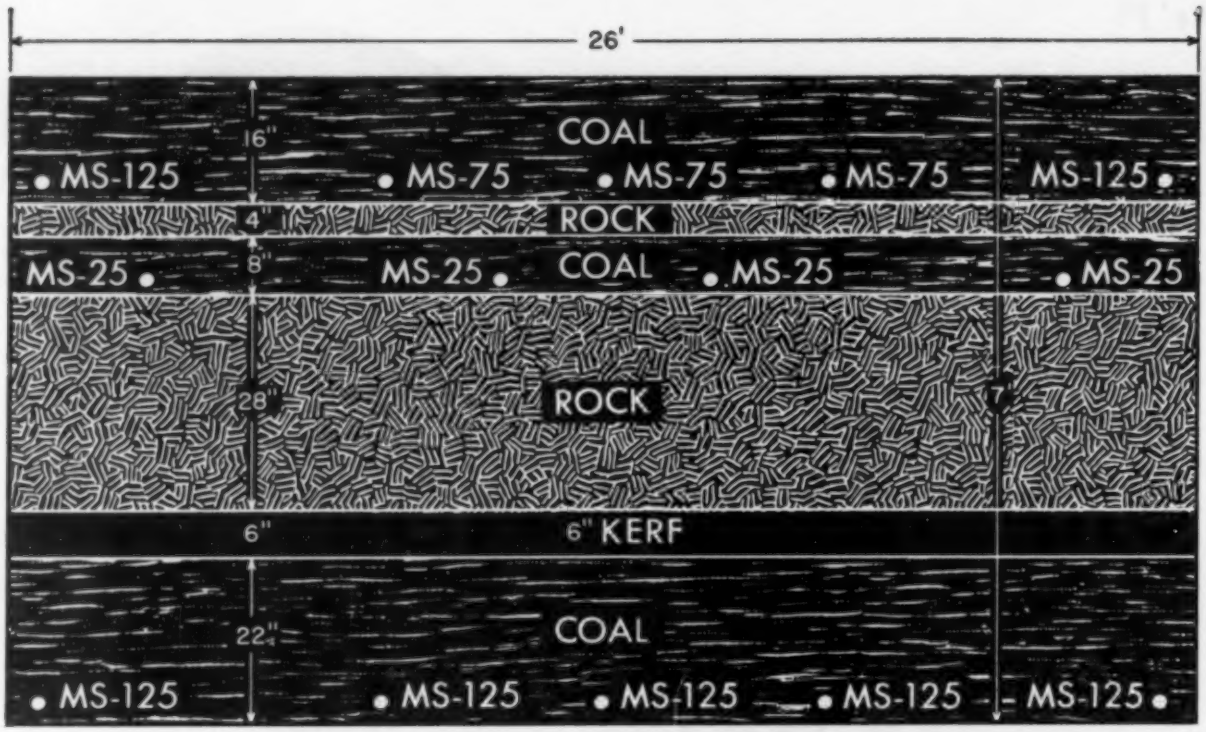

The use of Du Pont MS delay caps has improved both safety and production in this Central Alabama coal mine with a real "middleman" problem.

Use of Du Pont MS DELAYS promises new savings and increased safety

New Du Pont 20-shot blasting machine just declared permissible

Multiple firing with short-interval, delay electric blasting caps has led the way to increased economy and safety in many hard rock mining and quarrying operations. Permissible short-interval, delay blasting with Du Pont MS Delay Electric Blasting Caps will give the same advantages in coal shooting.

Short-interval, delay multiple firing gives:

A. INCREASED SAFETY . . . *because*

1. It reduces exposure to dust, fumes, smoke, and falls of coal, as it is unnecessary to re-enter the room until all shooting is finished.
2. It is easier on the roof and ribs, thus reducing the hazard from roof and coal falls.

B. INCREASED ECONOMY . . . *because*

1. The reduced shooting time produces more coal per man-hour.
2. Improved displacement gives better loadability.
3. More efficient blasting gives a lower powder factor.

And the new Du Pont 20-shot permissible blasting machine was designed especially for short-interval, delay multiple firing in coal mines. It is authorized by the U.S. Bureau of Mines for firing up to twenty 16-foot iron wire MS delay electric blasting caps.

For complete information on permissible blasting with Du Pont MS Delay Electric Blasting Caps and the Du Pont 20-shot permissible blasting machines, see your Du Pont representative or write directly to Du Pont, Explosives Department, Wilmington 98, Delaware.

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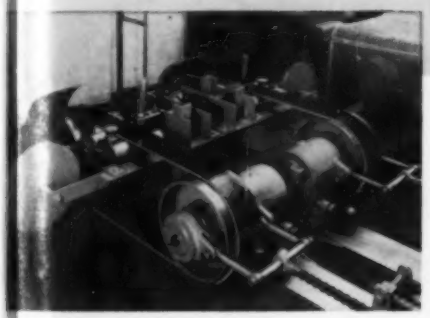
Better Things for Better Living . . . *through Chemistry*

Supreme in mining service

—for highest strength
—for lighter weight
—for longer life



partial tests for edge-wear
ow Scandura far ahead in
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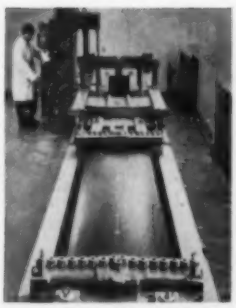

Tensile and impact tests constantly check Scandura for superior strength in service.

Scandura

GOLD LINE

PVC MINE BELTING

Scandura PVC Mine Belting surpasses every standard heretofore accepted for mine conveyor belts—in the laboratory, in the mine, and in point-by-point comparison with other materials. Safe Scandura PVC (Fire Resistant U.S.B.M. 28-1) is stronger because of unique, solid-woven nylon carcass construction—lighter, more flexible, amazingly long-lived with its exclusive PVC impregnation and surface cushions. Find for yourself how superbly Scandura resists wear, mechanical damage, moisture and abuse —install a length in your present system, and compare!

Made in U.S.A.

Manufactured at CHARLOTTE, NORTH CAROLINA by SCANDINAVIA BELTING CO.

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News Roundup

THE MEMBER nations in 7-yr old European Coal & Steel Community

Changing European Fuel Picture Poses . . .

Increased Threat to U. S. Coal Exports

Some observers insist export dip is temporary and expect resurgence as European energy needs expand. Others close to the situation waggle fingers at flood of Sahara oil poised for market . . . look for gradual erosion of export market with exception of some high-grade metallurgical.

ECSC Imports of Bituminous Coal from U. S. in 1958

Nation	Tons
West Germany	9,708,332
France	3,000,913
Italy	6,989,027
Netherlands	5,515,399
Belgium, Luxembourg	2,280,116

PARALLELING the United States' economy, Europe has made a fast recovery from its 1958 recession and now appears ready for a decade of rapid growth and prosperity. Reflecting this belief is the fact that in recent months stocks of European industrial firms have been bid up to new high levels by investment concerns.

In sharp contrast to the widespread feeling of confidence among European industrial leaders is the plight of coal in the European Coal & Steel Community. The ECSC, comprised of West Germany, France, Italy, The Netherlands and Belgium and Luxembourg (Benelux), is experiencing the worst coal crisis in its 7-yr history. With stockpiles at record levels and thousands of miners unemployed, the High Authority, an administrative committee made up of representatives of the nations in the Community, is faced with the necessity for quick action.

Any decision the High Authority makes will have a weighty effect on American coal exports because the six-nation group consumes the bulk of bituminous coal shipped to Europe (about 84% or 27 million tons in 1958), which last year totalled about 32 million tons. For the first half of 1959 shipments to ECSC nations added up to 8,963,539 tons, down from 14,551,443 for the same 1958 period.

Basic difficulty of the ECSC since its formation in 1952, say informed authorities, has been its inability to work together for the benefit of all under one common policy. Disunity over the growing coal crisis became so acute that, on May 14, for the first time in the ECSC's existence, the Council of Ministers from the six member nations openly rejected a proposal of the High Authority aimed at easing the coal crisis. The program would have (1) reduced imports; (2) regulated production; (3) frozen pithead stocks; and (4) maintained miners' incomes.

France answered the proposal by saying it did not want the High Authority to control its coal production. Germany, weighing economics against politics, and having already trod heavily on U. S. toes by imposing a $4.70 tariff on imports, rationalized, in the opinion of many, that the situation was not grave enough for import quotas. Italy decided that the controls suggested were not strong enough and wouldn't justify cutting U. S. imports, upon which it has strongly depended, because the problem would not be corrected anyway.

The reasons offered, it has been noted, reflect the lack of coordination and wide gap in thinking between the ECSC nations. Several of them have tried to solve their own problems with internal policies but have had little success to date. In some cases they have intensified the confusion and bitterness.

For example, Germany, largest importer of U. S. coal, established some 6 mo ago a coal-oil cartel agreement under which large oil firms doing business in that country pledged to sell heavy heating fuel only at world market prices of about $21, which was equivalent to German coal prices. The firms, including Esso A. G., Shell, Mobil Oil, Benzin und Petroleum A. G. and British Petroleum, also pledged not to make any effort to gain new heavy heating fuel customers.

To further alleviate the situation, Germany slashed U. S. coal shipments to 30% of the peak figure. But neither the cartel, the cutbacks in imports nor a

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Manufacturers of special wire ropes for strip shovels, loading shovels, draglines, shaft hoists, haulage, underground scrapers, loaders, mining machines, conveyors, car pullers, and blast hole drills. 167

pickup in activity by heavy industry brought about the desired results. The trend to petroleum continued this year despite the fixed price of $21 a ton as against an average price of $18 for a ton of high-price Ruhr coal. Difficulties of the coal men were accentuated by a sales drive by small independent oil distributors who had been undercutting cartel members up to $6 a ton.

In mid-August, the oil companies learned that the government, seeing no progress, was considering a $7.14 per ton tax on fuel oil. Angered and eager to scrap for their markets again, the oil concerns pulled out of the cartel which promptly collapsed. The government found itself at the beginning of September with pithead stocks at the record height of 18 million tons and the fuel industry in perhaps a worse shambles than before.

Italy—With little quality coal of its own, Italy imports coal from countries outside the Community at considerably lower prices varying from $3 to $5 less per ton. Asked last April to reduce coal imports from countries outside the ECSC, Italy refused, stating that suspension of American coal imports, its biggest source of supply, would have a damaging effect on Italian shipowners, already hard-hit by drastic drops in sea freight rates. But those close to the Italian coal situation say that if some common decision should be reached by all of "Little Europe," Italy might conceivably comply with the ECSC request and reduce U. S. imports.

France—Not as hard hit as some of the other member nations because of low mining costs and fairly good-grade coal, France has trimmed U. S. imports sharply, but in reply to a recent suggestion that the Community declare a general crisis, returned that it did not see why it should "import unemployment" to reduce a European surplus for which other nations in the coal pool were responsible. It contended that although there had been a slight recession in the country, its economic program did not entail cutting industrial output.

Benelux—Luxembourg continues to take small amounts of U. S. coal, but Belgium, hardest hit of all the ECSC nations because of narrow hard-to-mine seams and high costs, came to point of riots several months ago over the proposed closing of several mines. Unemployed miners, who had been receiving 20% of their former salaries through ECSC aid, pointed to U. S. imports as the reason for their plight and as a result, imports for 1959 were limited to 1,450,000 tons of coal. Production goals for the year were slashed to 24.3 million tons from 30 million but stockpiles have continued to mount with no sign of abatement.

Netherlands—Though not as troubled as Belgium or Germany, the Netherlands has decreased U. S. imports in recent months as its own surpluses built up. Anxious to reduce outside dependence, it has been pursuing a program of mine and coal field development with the long-range goal of applying much of its own coal to power needs while continuing to import small amounts of high-grade metallurgical.

Metallurgical—The belief that the market for U. S. metallurgical coal, which is of a superior quality and competitive in price to European coal, is indefinitely secure is not held by all observers. Many experts believe that the drive by European nations, such as the Netherlands and Germany, implemented by research in blending, may lead to the

INSPECTING new lab at Eastern Gas are: G. Granger (left), vice president, research; Dr. R. Eddinger, manager-research lab; and J. Mitchell, research director.

MODEL coke oven with movable sidewall permits gas expansion study.

Coal Research Lab Expansion Completed by EG & FA

Expansion of a research center with the purpose of developing better and more economical blends of coal for the iron and steel industry has been completed at Everett, Mass., by Eastern Gas & Fuel Associates. The Everett development is considered to be one of the finest research centers for special coals in the world.

Using four types of miniature coke ovens and a variety of American and European test equipment, scientists at the center will attempt to furnish bituminous coal users in this country and abroad with the most detailed advance information on the probable behavior of coals as they are made into coke and on the quality of the end-product.

For Eastern's own coke plants, size, strength and other characteristics of coke will be key considerations. Beyond this, the laboratory is working on several special projects, among them, the creation of novel blends of other materials with coking coals.

The expanded facilities, which are adequate to experiment with amounts of coking coal running from a single ounce to 500 lb, will permit, when tied in with the firm's bituminous mines, coke plants and blast furnace, complete evaluation of coals from the mining stage through actual plant-scale coke use.

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The right heft and a sharp point always. Points of highest quality heat-treated tool steel are set in tapered sockets, easy to renew when worn. Heads made from special steel, properly designed for weight and balance.

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7-4A	½" ROPE
7-6A	⅝" ROPE
7-7A	¾" ROPE

eventual diminishing of the metallurgical export market as well as the steam coal market.

The Future—American exporters are asking what all these recent developments mean. Many authorities, including some in Europe itself, have been persistant in voicing the opinion that America's coal exports to Europe would certainly resume an upward trend as population and industry moves ahead

But many optimistic voices have been stilled as the giant French Sahara, with its massive oil and gas deposits, lengthens its shadow over the European fuel picture. With the emergence of Africa as a potentially undreamed of source of oil and gas has come the realization by many that American coal may not be needed to fill the energy gap in Europe.

France is determined to see that Sahara oil, which will be in production in 1960, gets to market. Initially, the volume marketed won't be large enough to create a real problem (scheduled 1960 output: 180,000 to 200,000 b/d) because France intends to absorb about 80% of the production herself.

But Sahara production, say the French, will continue to grow by leaps and bounds for some years thereafter. The actual volumes are only a guess. Government officials estimate "national" crude supply as high as 580,000 b/d by 1962, 700,000 b/d in 1963 and 1,000,000 b/d by 1965.

Estimate of Community's Energy Requirements

(in millions of tons, coal equivalent)

1950	1955	1960	1965	1975
309	433	503	582	717–760

Coal Terms—The new oil discoveries in the Sahara may mean a flow of 50 million tons (equal to 75 million tons of coal) by 1965 and 100 million tons equal to 150 million tons of coal) by 1975. These enormous quantities must be viewed against the background of Europe's total consumption of petroleum derivatives in 1957—only 55 million metric tons.

Natural Gas—With the oil will come gas in amounts estimated at 30 million tons by 1965 and 60 million tons (coal equivalent) by 1975. And the French government, it is reported, feels very strongly that Sahara gas should be used to fill the gap between Europe's static energy production and its growing needs. Various sources say that there is little doubt that the French would bring pressure upon the ECSC to limit American coal exports to Europe if the marketing of Sahara gas were at stake.

In fact, plans for bringing Sahara gas into Europe are already in full swing. Two French groups are now dickering with Constock International Methane on a possible methane tanker deal. Just about every international pipeline company including U. S. firms has offered to tackle a sub-Mediterranean pipeline project. One Canadian-U. S. firm is reportedly interested in building one or more 36-in lines from Hassi R'Mel in the Sahara through the straits of Gibralter and up through Europe.

After That—When researchers look beyond the coming decade for a resurgent U. S. coal export market they encounter the distinct possibility that atomic energy may be nearing a competitive stage by then. Europe already has its share of reactors and has several large research programs under way to investigate the economies of the atom for energy. Thus, although the export market probably will not be drastically reduced for some 3 to 5 yr and its long-term prospects cannot be entirely discounted, the picture has certainly become less bright than several years ago, say observers. Some, downright pessimistic, would even say "the handwriting is on the walls."

Study Coal Pipeline

The possibility of moving coal practically and economically by pipeline from West Virginia and Pennsylvania mines to the East coast for use by big utilities is now being studied by Consolidation Coal Co. and Texas Eastern Transmission Corp., large pipeline operator.

Consolidation Coal has been successfully operating for a year a 135-mi coal pipeline from one of its mines at Cadiz, Ohio, to Cleveland Electric Illuminating Co.'s Eastlake power plant. In its 1958 annual report Cleveland Electric reported that by year-end the delivered cost of coal, some ⅓ of its total coal requirements, had dropped to a level lower than the average for the two preceding years.

A. R. Matthews, Consolidation president, emphasized that the company has made no firm commitments on the use of a new pipeline. At this point "we have some coal and an idea, but no customers and no right-of-way," he said. But several large eastern utilities have indicated they would be interested, among these Consolidated Edison Co. of New York, Public Service Electric & Gas, Pennsylvania Power & Light and Baltimore Gas & Electric.

Texas Eastern, which has had wide experience in the pipeline field, mostly with gas and petroleum products, is conducting a study on the line's feasibility. The exact route is undetermined but reports say Texas Eastern owns "multiple rights" for a line from the Oakford storage basin in Western Pennsylvania, which is centrally situated to the areas to be supplied with coal, and an adjacent line is a possibility.

It is estimated that the pipeline, which would be in the neighborhood of 350 mi long, would take 3 yr to build. One economic hurdle such a line would have to overcome would be the limitation of the line to one source of supply. Utilities generally buy from a number of coal companies who compete for the business.

Briquetters Hold Sixth Conference

Briquetting without binder was the major topic at the 6th biennial conference of the International Briquetting Association, Glacier Park Lodge, E. Glacier Park, Mont., Aug. 24-26.

At the business meeting J. M. Moore, C. M. Reiss Coal Co., Ashland, Wis., was chosen president, succeeding C. W. Link, Berwind Fuel Co., Superior, Wis. A. F. Olson, Cliffs Dow Chemical Co., Marquette, Mich., was elected vice president and Neal Rice, Natural Resources Research Institute, University of Wyoming, Laramie, Wyo., was re-elected secretary-treasurer.

The complete program included the following:

"Charcoal Briquetting Technique," Paul D. Haigh, Komarek-Greaves & Co., Chicago.

"Symposium on Charcoal Briquetting," Mr. Olson; L. W. Mims, Cabot Carbon Co., Gainesville, Fla.; and A. F. Trussler, Charcoal Industries, Inc., Paso Robles, Calif.

"A Survey of Current Views Regarding the Influence of Important Factors in Briquetting Coal with Binders," R. P. Charbonnier and J. Visman, Dept. of Mines and Technical Surveys, Edmonton, Canada (read by Dr. E. Swartzman of the same department, Ottawa).

"A Laboratory Study of the Binderless Briquetting of Western Canadian Subbituminous Coals," J. L. M. Picard, A. R. McKenzie and J. Visman, Dept. of Mines and Technical Surveys (read by Dr. Swartzman).

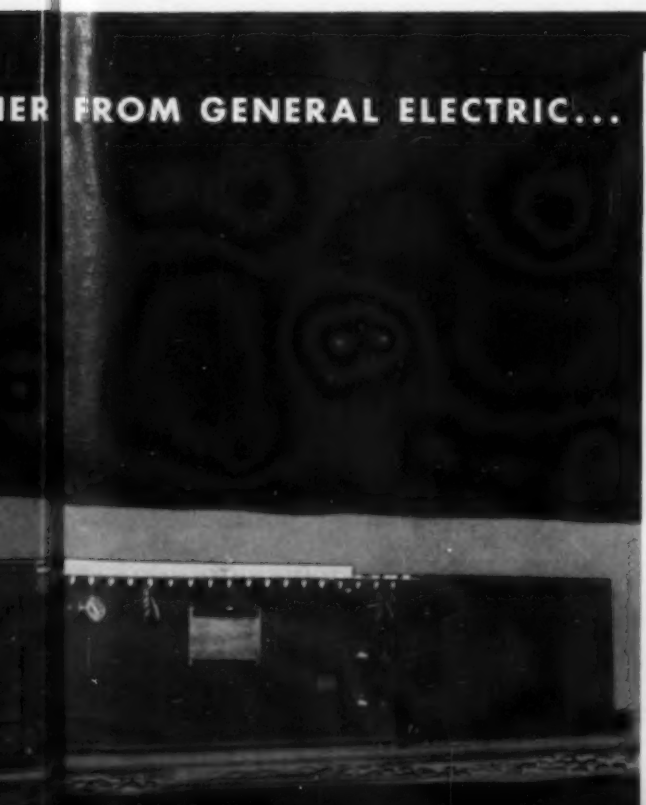
"The Problem of Briquetting Slack Coal in India," M. S. Iyengar, Fuel Research Institute of India (read by W. S. Landers, chief, Branch of Coal Technology, U.S.B.M., Denver).

"Binderless Briquetting of Indian Lignite," Mr. Landers.

"A Discussion of Binderless Briquetting in England," Dr. R. R. Gordon, National Coal Board, London, England.

"Laboratory Study on the Agglomeration of Coal in the Presence of Plasticizing Agents," Lewis H. King, Dept. of

(*Continued on p 60*)



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Thirty-inch height makes "Lo-Boy" especially valuable for your present and future low-seam operations. New low height and two-car design provide approximately double the kw capacity in the same space required by other conversion means.

The equipment operates unattended. All live parts are enclosed. It's available in ratings from 300 to 500 kw, 275 and 300 volts d-c.

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New power! New design! New features! Plus a new drive option—Cat power shift transmission! The result: higher production on any application!

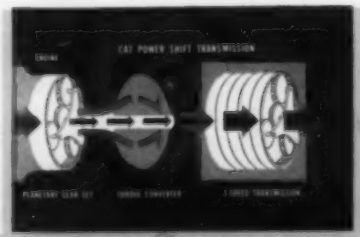
Now the "King of the Crawlers" is better than ever with new pace-setting capacity for higher, faster, lower-cost production on *any* big tractor application!

The biggest "new look" in the giant D9 Series E is the undercarriage. It's more massive . . . more rugged than ever. It'll add hours of life to running gear on even the toughest jobs. *Every* track component is new in design, highlighted by a big, new link—its pitch is increased 1¼" to 10¼"! And a new Caterpillar-developed steel alloy strengthens links, shoes, rollers *up to 40%!*

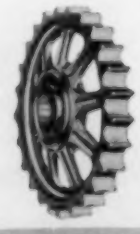
That's not all: the new D9 packs more power—335 HP. Its new equalizer bar gives greater stability on any terrain for greater operator confidence and production. A wider seat with a new spring-loaded adjustment mechanism makes the operator more comfortable, more efficient. No detail has been overlooked to make the new D9 handle heavier loads faster—and at lower operating and maintenance costs than ever.

And that's not all. Now, along with direct drive and torque converter, you have your choice of the new Cat

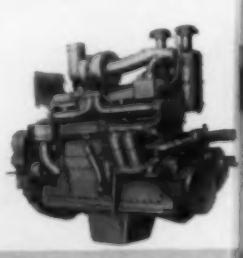
Dry-type air cleaner. Removes at least 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Reduces maintenance time and cost.



Exclusive feature. A planetary gear set splits the power from the engine. Part goes directly to the 3-speed transmission, the rest goes through a torque converter to transmission.

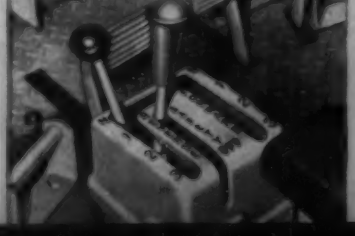


New sprocket. Sprocket is strengthened by new design with increased tooth thickness. Hunting tooth action provides slower wear rate.



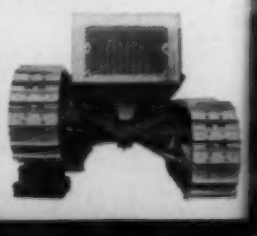
New 335 HP. More powerful than ever, the D9's Turbocharged Engine has the capacity to handle bigger loads faster, with dependability, economy.

New Turbocharger. New, compact turbocharger packs more air into the engine. Open impeller wheel (shown below) helps prevent dirt build-up.



New power shift transmission. Optional on the D9. With this development you can shift go-the-go under full load with one lever and no clutching in a split second!

New, bigger, more rugged undercarriage. Major improvements in all track components add hundreds of hours of life to running gear—hours that mean more time on the job.



New equalizer bar. Greater stability. The rocking action of the bar shifts more weight to the up-hill track.

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ower shift transmission. This revolutionary transmission, ested under the most rugged conditions, combines for the *irst* time the positive feel of direct drive with the flexibility nd anti-stall features of torque converter. With one control ever and no clutching, it reverses direction . . . changes peed . . . smoothly . . . under full load . . . in a split second!

Many of the new features, along with some familiar retained features, are shown here. Look them over. They'll give you an idea *why* the new D9 can mean higher production and more profits for you. For complete facts, see your Caterpillar Dealer. Ask for a demonstration and watch this giant eat up the work!

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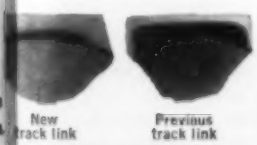
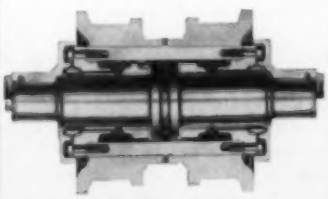
NEW D9 SERIES E— BORN OF RESEARCH PROVED IN THE FIELD



Light area at top indicates depth of hardening

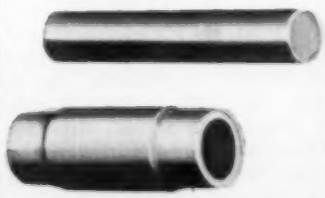
New deep hardening steel. Caterpillar-developed steel alloy (plus more steel in stress areas) gives up to 40% longer life to track shoes, links and rollers.

Better visibility. Redesigned fuel tank gives better visibility to the rear and tapered hood offers unexcelled forward vision.



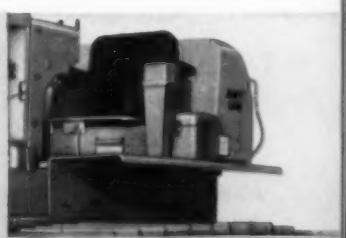
Lifetime lubricated track rollers. Lifetime lubrication eliminates servicing problems. Oil is retained by dirt-proof, floating-ring seals.

Stronger track shoes. New alloy permits deeper hardening in wear areas. Grouser height is increased 3/8" for better penetration and prolonged service life.



Larger pins and bushings. Diameters are 1/4" larger. Increased size reduces deflection and provides better contact along the length of the wear surfaces.

New foot decelerator. Provides easier machine positioning. Allows deceleration without taking hands from controls (optional on direct drive, standard on others).



New seat adjustment. New spring-loaded adjustment mechanism provides more positive cushion and back rest positioning. Wider seat for more comfort.

Bigger, heavier track links. Strength has been added in stress areas. Pitch increase from 9" to 10 1/4" strengthens all track components.

People in Coal

Company Heads Step Down . . . Will Continue as Directors

A. H. TRUAX, a founder of Truax-Traer Coal Co., retired July 30 as chairman of the board, but announced his intention to continue as a director.

Born in Marshall, Minnesota, in 1889, Mr. Truax and his brothers were early settlers in North Dakota and among the first miners of lignite in that state. They mined the lignite underground at Noonan, starting around 1909, and later began stripping operations at Kincaid, in 1919.

After a meeting with Mr. Traer Sr. and Mr. Traer Jr., who were conducting an exploration program for lignite at the time in North Dakota, a business relationship was established which led to the eventual formation of the Truax-Traer Coal Co. in 1927.

Mr. Truax, who now makes his home in Flatt, Ill., became vice president when the firm was founded, was made president in 1931 and became chairman of the board in 1952.

G. W. TRAER JR., also a founder of Truax-Traer Coal Co., retired July 30 as chairman of the executive and finance committees, but will continue as a director.

Mr. Traer, born in 1889, entered the coal business as assistant to the chief engineer at a Danville, Ill., mine, run by his father, a prominent Illinois coal operator. In 1912, because of a prolonged strike in the coal fields, Mr. Traer Jr. left the Danville operation, joining the Chicago firm of A. B. Leach & Co., investment bankers.

While stationed in Minneapolis for the firm, he learned of the electric utility industry's need for lignite coal as a fuel, and he and his father undertook an exploration program in North Dakota.

It was at this time that he met and formed an association with Mr. Truax who was mining lignite at Kincaid, N. D. They later formed the Truax-Traer organization.

Charles Spencer has resigned as president of Blue Coal Corp., a wholly owned subsidiary of Glen Alden Coal Co. Mr. Spencer, who will take a position as partner in a Milwaukee advertising firm, has been with the Glen Alden organization for 25 yr. **Harry Bradbury**, president of Glen Alden, will assume the presidency of Blue coal as a further step in more closely integrating the production and marketing activities of the company.

Robert Pierce, Enumclaw, Wash., has been appointed chief mine inspector for the state of Washington, to succeed Clarence Holmes, who recently retired. Mr. Pierce has been superintendent of the Palmer Coking Coal Co. and has been in the coal industry more than 25 yr. He will make his headquarters in Seattle, where he also will serve as part-time construction inspector for the state Dept. of Labor & Industries.

David L. Francis has been reappointed chairman of the National Resources Committe of the Chamber of Commerce of the United States. Mr. Francis is a director of the Chamber and is president of Princess Coals, Inc., Huntington, W. Va. Three coal men were newly appointed to the 45-member committee: F. S. Elfred, chairman of the board, Peabody Coal Co.; Rodney E. Sachs, president, Boone County Coal Corp.; and Norman E. Kelb, president, Ayrshire Collieries Corp. Two others were reappointed: Edwin R. Phelps, vice president, Pittsburg & Midway Coal Mining Co.; and Walter F. Schulten, vice president, Consolidation Coal Co.

Ward R. Stahl of the Pittsburgh office of the U. S. Bureau of Mines has been elected secretary of the American Standards Association's sectional committee M13 on rockdusting coal mines to prevent coal dust explosions. The committee, sponsored by the American Institute of Mining, Metallurgical & Petroleum Engineers, is working on the revision of this American Standard safety procedure. American Standard M13 was originally

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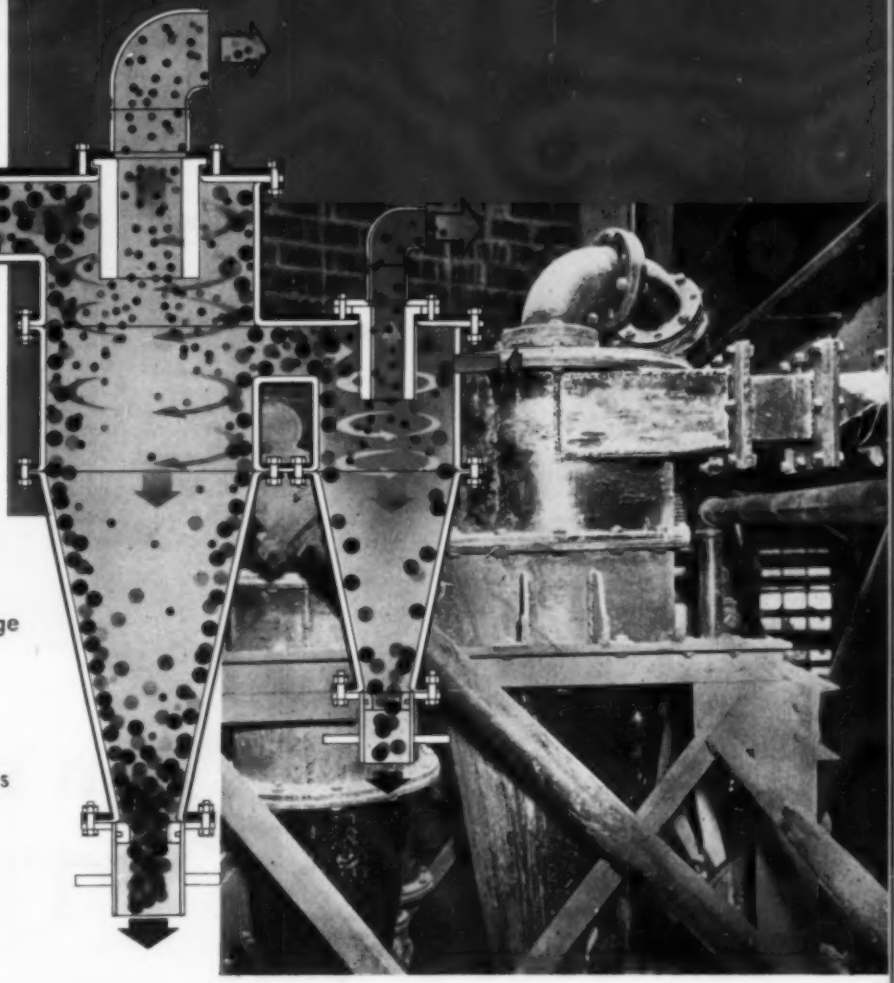

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People in Coal *(Continued)*

written in 1925 and has been reaffirmed several times since then, the last time in 1942.

North American Coal Corp. has announced several appointments in a newly organized Southern Div., which was formed as a result of the acquisition of the Hurricane properties from the Warner Collieries Co. June 1, 1959. **Robert N. Morris** has been named general manager of the division and **Robert A. Maurer,** manager of mines. The Southern Div. comprises mining properties in District 8: Red Parrot mine, Prenter, W. Va.; Red Cedar mine, Keith, W. Va.; Hurricane mine, Mammoth, W. Va.; and in District 7 The C. H. Mead Coal Co., East Gulf, W. Va. Mr. Morris is a graduate in mining engineering from the University of Illinois. He joined North American Coal in March, 1955, as assistant to the vice president—production. In this capacity he was in charge of the Industrial Engineering and Preparation Dept. of the firm. Mr. Maurer, formerly general manager of the Red Parrot Coal Co., is a graduate of the School of Mines of West Virginia.

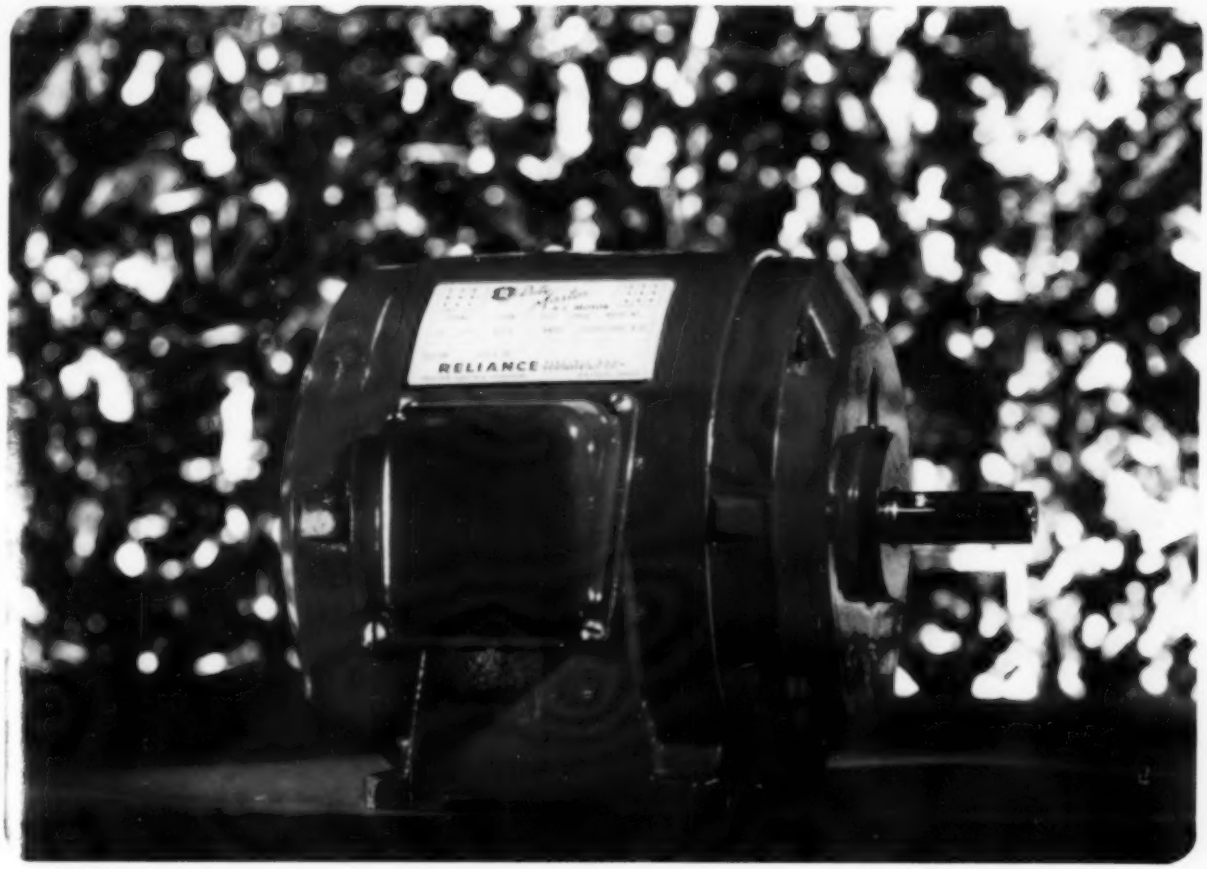
F. S. Elfred, chairman, Peabody Coal Co. and chairman of the National Coal Association, presented to the AMC session recently recommendations for a resolution on solid fuels which was unanimously adopted. The resolution included such measures as establishment of a national fuels policy, expansion of research to develop new coal uses, establishment of an independent coal research agency of the government and an increase in the percentage depletion rate for coal.

Christopher Coal Co. has announced several personnel changes. **Warren Sharpenberg,** superintendent at Osage No. 3 mine, becomes superintendent of Arkwright No. 1. **Glenn Cyphert,** superintendent of Arkwright No. 1, becomes superintendent of Osage No. 3 and **Elmer L. Murphy Jr.** will be production engineer at Arkwright No. 1.

Daniel C. Tabor, division superintendent in the Pocahontas Fuel Co., retired after more than 40 yr continuous service with the firm. He was employed by the company in 1917, advancing through the supervisory ranks to his present position.

Obituaries

Edgar C. Weichel, former vice president of the Hudson Coal Co., died Sept. 10 in Concord, N. C. He had been retired since 1955.



a brand new A-c. motor

the DUTY MASTER

A completely new motor produced by The Reliance Electric and Engineering Company and its Master Electric Division. Duty Master offers built-in protection, simplified lubrication and improved performance.

Duty Master shows that all motors are not alike, see next page for details.

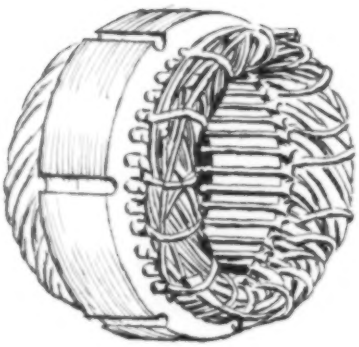
Available now from stock, 1 thru 250 hp. in all enclosures.

RELIANCE : **MASTER**

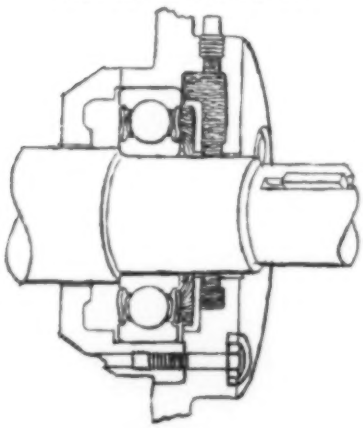
ELECTRIC AND ENGINEERING COMPANY : ELECTRIC COMPANY DIVISION

Earl C. Barnes, Chief Engineer

"Duty Master is built to last from the inside out."



PROTECTED WINDINGS



METERMATIC LUBRICATION

"Built-in protection was the aim in designing the Duty Master. From the steel core to the cast iron frame, everything possible has been done to insure long life under severe operating conditions.

"The insulation is moisture-proof and acid-resistant. Windings are thoroughly dried, pre-heated and impregnated with multiple dips in thermosetting varnish, and finally given a sealing coat of finishing enamel.

" 'Metermatic' bearing lubrication fits any plant lubrication schedule. Motor bearings are lubricated constantly from a large reservoir. A metering plate feeds measured amounts of grease to the bearing as required. The reservoir and automatic grease relief along the shaft make it impossible to over or under grease the Duty Master.

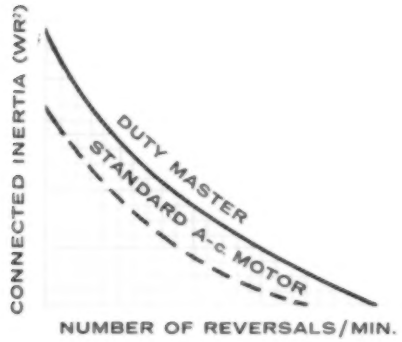
"Whatever your requirements, Duty Master gives you extra built-in protection and longer motor life." *Earl C. Barnes*

RELIANCE — Duty Master A-C. MOTOR

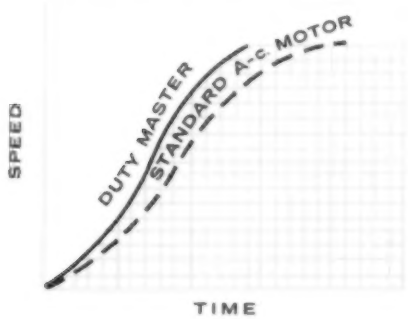
Dr. C. G. Veinott, Chief A-c. Design Engineer

"Duty Master's electrical design provides improved operating characteristics."

REVERSAL



ACCELERATION



"The electrical design of the Duty Master was thoroughly analyzed through the use of digital computors. The purpose of this specialized work was to produce a motor with maximum operating characteristics and maximum efficiency.

"The most visible result of the extensive computor program is the new low inertia rotor. The rotor, like the rest of the Duty Master, takes advantage of new materials and techniques. This rotor, plus better ventilation and other refinements, gives a definite improvement in acceleration, reversals and start-stop performance.

"This is just one example of many mechanical and electrical design changes that make Duty Master a new motor, not just a face lifting." *Dr. C. G. Veinott*

RELIANCE — **Duty Master**
A-C. MOTOR

John Walker, Manufacturing Manager

"Manufacturing quality and deliveries are emphasized for Duty Master."

"A motor design is no better than the finished product. That is why we lay particular emphasis on experienced plant people and top quality materials.

"New automatic winders, annealing furnaces, conveyor systems, turning and welding equipment are another part of the quality picture. Equally important is proper scheduling to deliver the motor on time. The new Duty Master is not only an exceptionally good motor, it is an available motor, ready for delivery without unwarranted delay." *John Walker*

Duty Master Motors, 1 thru 250 hp. in all enclosures, are ready for immediate off the shelf shipment from Reliance Distribution Centers and Warehouses across the country. Contact your Reliance Sales Engineer for complete information, or write today for Bulletin No. B-2106.

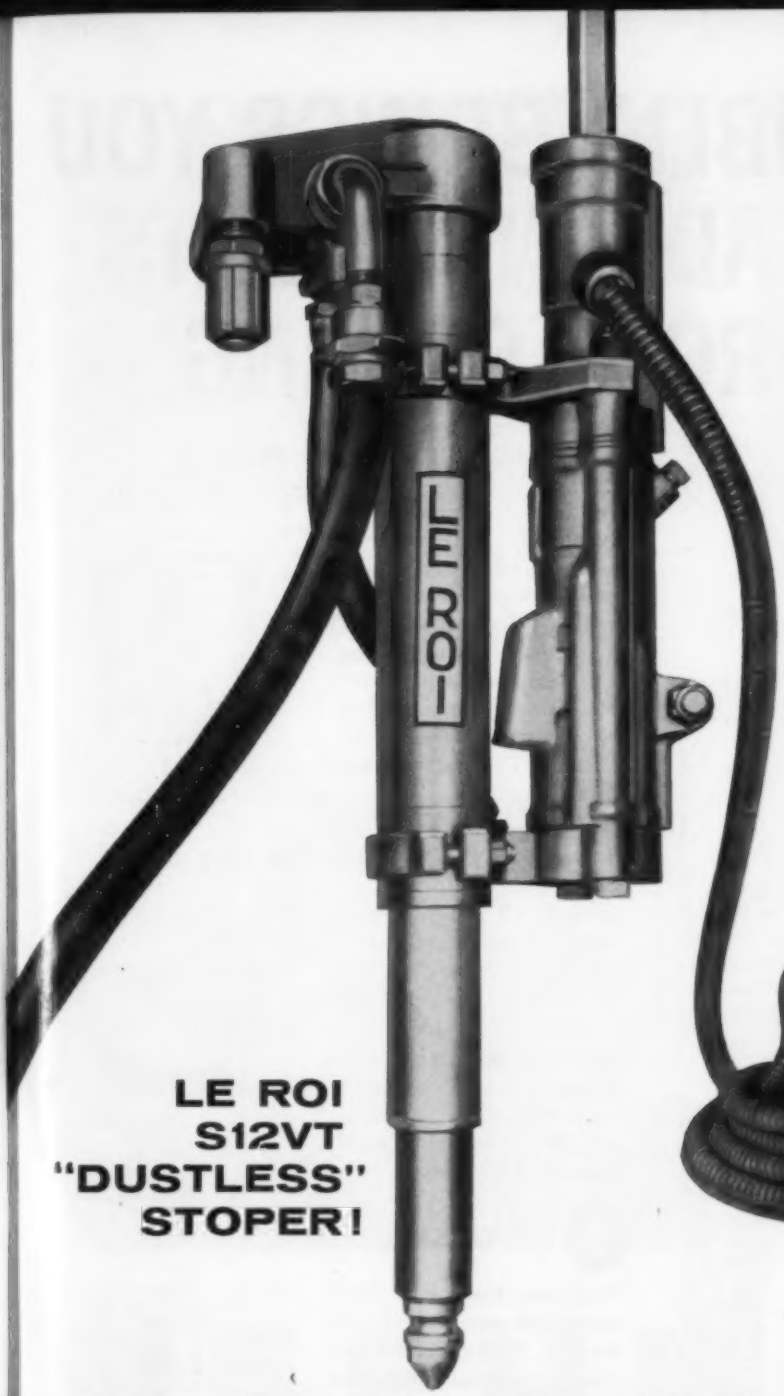
RELIANCE ELECTRIC AND ENGINEERING CO.

CLEVELAND 17, OHIO
CANADIAN DIVISION: TORONTO, ONTARIO
Sales Offices and Distributors in Principal Cities

MASTER REEVES R

B-1634 Printed in U.S.

NO ABRASIVE DUST GOES THROUGH THIS STOPER



LE ROI S12VT "DUSTLESS" STOPER!

Abrasive dust will never take this fast, hard-hitting stoper out of action! The exclusive Le Roi dust-collecting system enables you to get miles of trouble-free drilling footage in wet, soft, or hard formations. It protects the tool as well as the operator — lowers dust-count well below wet-drilling standards.

The S12VT draws cuttings through 5-hole CRD or Vac-Nu-Matic® bits. Dust is then passed through the hollow drill steel and out the chuck housing — *not through the stoper* — and into the dust box. The powerful suction keeps hole clean for faster, easier drilling — prevents stuck steels regardless of strata conditions.

This amazing "dustless" drill is light — it's easy to use and move. All controls are on the feed leg for convenient operation and greater operator safety.

Check all the features of the S12VT — ask your Le Roi distributor about it today! Or write to Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wisconsin.

LE ROI NEWMATIC® AIR TOOLS

PORTABLE AND TRACTAIR® AIR COMPRESSORS • STATIONARY AIR COMPRESSORS • AIR TOOLS

Distributed in the Coal Fields by: Acme Machinery Company, Huntington, West Virginia, and Equipment Service Company, Inc., Birmingham, Alabama.

AT-902

NOW! REPUBLIC BRINGS YOU 3 MAJOR ADVANCEMENTS IN MINE ROOF BOLTING*

HERE'S THE ASSEMBLED UNIT WITH REPUBLIC RS-1 EXPANSION SHELL

Advanced, all-purpose RS-1 has strong, flexible leaves for simple installation, and quick, efficient tightening. Narrow base support for the leaves assures easy, dependable expansion.

Republic offers the largest combination of roof bolts, roof plates, and expansion shell assemblies available—for virtually any application, in any type of formation. Get details now.

MATERIAL CONTROL CERTIFICATE with every Republic Roof Bolt shipment gives specific physical properties of steel used. Data includes yield point in pounds per square inch, yield and break point in pounds, other information. Guesswork about performance is eliminated!

1 PRECISION-TAPERED PLUG

Engineered for proper shell expansion. Note angle of taper in illustration—the precise degree required for strength, dependability, and quick, efficient tightening. This improved Republic plug is versatile and adaptable, and is particularly effective in relatively soft formations.

2 HEAVY-DUTY SUPPORT NUT

Square nut provides over 40% better support than even the best previous method, yet maintains proper bolt tension by stripping at approximately 50 pounds torque with no damage to bolt threads . . . can be applied either side up to expedite assembly.

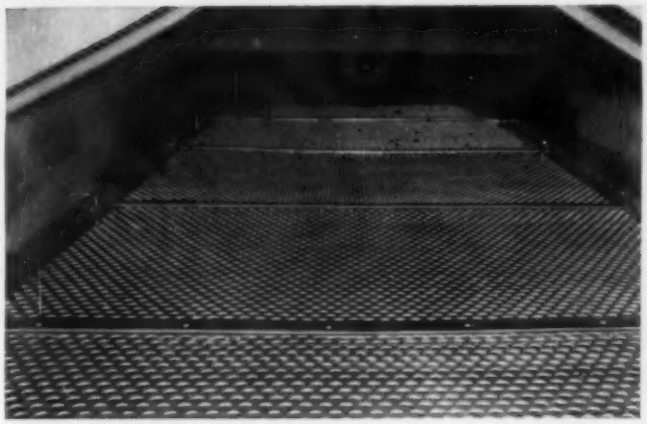
3 IMPROVED SELF-CENTERING HEAD

Compact, one-piece head eliminates need for second washer. Heavy flange, and thick, reinforced washer are guided cleanly and firmly into position in bolt plate. Entire unit forged, for ruggedness and strength. Standard 1⅛" head available with ¾" and ⅞" bolt sizes.

*Complete Unit Can Be Shipped Fully Assembled

. . . as shown at left . . . to prevent loss of parts, prevent damage to bolt threads, save you assembly costs.

Specify Republic Roof Bolt Plates, Too!



SUPERIOR PERFORMANCE OF REPUBLIC ENDURO® STAINLESS STEEL used for this cleaning plant shaker screen has drastically reduced replacement expense. Reason is the excellent resistance of Republic Stainless to abrasion and corrosion. Other characteristics which pay service dividends in mine equipment applications include its good strength-to-weight ratio, easy cleanability, and high impact strength. In addition, Republic Stainless Steel is readily formed and welded, simplifying both manufacturing and maintenance operations. Mail coupon.

THE STRENGTH OF STEEL PLUS THE CORROSION-RESISTANCE OF PLASTIC are provided by Republic "Dekoron®-Coated" ELECTRUNITE® E.M.T. When properly installed, this versatile electrical raceway gives your circuits long-lasting protection against corrosive fumes, gases, and vapors. What's more, the extruded plastic armor of "Dekoron-Coated" ELECTRUNITE does not materially interfere with installation. Only ordinary tools are required. Joints are corrosion-protected by wrapping with pressure-sensitive plastic tape. Also available in rigid steel conduit. Send coupon for complete facts.

EXCELLENT SERVICE IN HANDLING MINE WATER is provided by Republic Flexible Plastic Pipe. Made of tough polyethylene, it is easy to handle in cramped quarters and conforms readily to irregular contours. Light weight and easy cutting and joining simplify installation. Relocation to meet changing conditions ceases to be a problem. Republic Flexible Plastic Pipe is impervious to the corrosive elements normally found in mine water, assuring years of trouble-free operation. Mail coupon for further information.

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Current Coal Patents

By: Oliver S. North

Rotary tunneling machine having ratcheting advancing and retracting means, J. S. Robbins (assigned to Goodman Mfg. Co., Chicago, Ill.), Aug. 11, 1959. In a rotary cutter head type machine for cutting large bores in coal seams, improved means is provided for supporting the cutter head during its advance towards and retraction from the working face. No. 2,898,742.

Ascertaining stresses and deformations in solid loaded materials, N. B. Hast, Aug. 11, 1959. A device and method is provided for measuring either absolute or fluctuating stresses and deformations in rock adjacent to mine workings. The device is positioned in a bore hole and subjected to a biasing force, and readings of change in pressure are made at intervals over a period of time. Alternatively, a relief hole is drilled nearby, and the amount of relief on the device provides a measure of the amount of stress present in the formation. No. 2,898,761.

Heavy media separator apparatus, W. C. Menzies, Aug. 11, 1959. Design for an extremely simple and low-cost heavy media separator which is of special utility for small operators, from the standpoint of low capital cost and upkeep yet good efficiency and capacity. The principle of cross-flow is used, and the tank is relatively shallow, so that a uniform specific gravity can be more readily maintained throughout its depth. No. 2,899,057.

Apparatus for separating granular materials having different specific gravities by means of a liquid, K. F. Tromp, Aug. 11, 1959. Improved construction for a coal washing tank consisting of a rotary bladed drum, so that the drum is capable of discharging not only the sinks but also the middlings. No. 2,899,058.

In situ combustion of stratum having an exposed face, F. W. Crawford (assigned to Phillips Petroleum Co., a corp. of Del.), Aug. 11, 1959. Process for recovering hydrocarbons by in situ combustion of a carbonaceous stratum, where a face of the stratum is exposed either in an outcrop or in a mine working. No. 2,899,186.

Bit mounting means for boring head cutters, A. R. Biedess (assigned to Goodman Mfg. Co., Chicago, Ill.), Aug. 11, 1959. Design for an improved rotary cutter and bit mounting means for continuous mining machines. The bit mounting means may be readily arranged to fit the different cutting radii of the various cutters. No. 2,899,187.

Apparatus for mine roof control, J. F. Joy (assigned to Joy Mfg. Co., Pittsburgh, Pa.), Aug 18, 1959. Design for an improved mine roof supporting mechanism incorporating spaced jacks which can be progressively advanced as the mine faces advances, and with but little resistance to roof subsidence. The jacks can be adjusted without interruption of roof support. No. 2,899,800.

Tensioning apparatus for rope sideframe conveyors, R. L. Sharps (assigned to Goodman Mfg. Co. Chicago, Ill.), Aug 18, 1959. Rope tensioning apparatus which is easy and quick to use, provides an immediate and accurate indication of rope tension, and enables precise tensioning of both ropes to exactly the same degree. No. 2,900,070.

Trimmer chain tensioning means for boring type mining machine, H. W. Driehaus (assigned to Goodman Mfg.

Inferior PARTS RESULT IN
MORE FREQUENT BREAKDOWNS
... USE ONLY GENUINE
JOY PARTS
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GENUINE JOY PARTS AVAILABLE AT 13 LOCATIONS:
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JOY MANUFACTURING COMPANY

How **THE JEFFREY MFG. CO.** mounts Timken bearings in their Permaseal® idlers to maintain prelubrication and positive sealing, reduce maintenance.

Conveyor belt moves materials at less cost with Timken® bearings rolling the load

THIS huge conveyor belt does a whale of a job moving materials speedily and economically at these ore docks in Philadelphia. And to keep 'em rolling at lowest cost, the conveyor belt is supported by Jeffrey Permaseal® idlers with Timken® tapered roller bearings. This type of conveyor handles ore, coal, lime, over-burden, salt and gypsum. Timken bearings on these applications assure minimum maintenance, long bearing life because:

1) *They hold shafts concentric with housings,* making idler seals more effective in keeping dirt out, lubricant in.

2) *The tapered construction* of Timken bearings lets them take radial and thrust loads in *any* combination.

3) *Full line contact* between rollers and races gives Timken bearings *extra* load-carrying capacity.

4) *And Timken bearings are made of steel that's nickel-rich for extra toughness.*

The Timken bearing is the only tapered roller bearing proved by 40 years of service in heavy-duty conveyors using the popular dead shaft construction. For better performance at lower cost, be sure the machines you buy or build are equipped with Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

This symbol on a product means its bearings are the best.

WHEN YOU BUY TIMKEN® BEARINGS YOU GET...

1. Quality you can take for granted
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BETTER-NESS rolls on

TIMKEN®

First in bearings for 60 years

tapered roller bearings

get instant indication of roof bolt tension for

SAFE ROOF PRACTICE

NEW YOUNGSTOWN VTI ROOF BOLTS

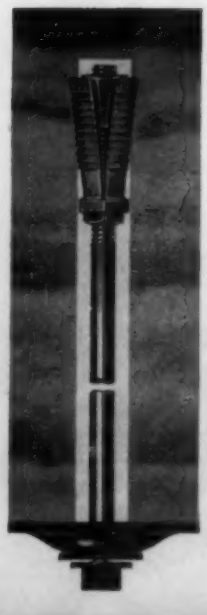
ASSURANCE. When VTI crimps flatten, tension is between 5,500 to 6,500 pounds . . . certain indication of a tight bolt and an anchorage strong enough to support the required tension.

If the VTI crimps have not flattened you know that the bolt has not been tightened to required tension. This may be due to:

1. Careless bolting
2. Defective equipment
3. Insufficient anchorage
4. Hole diameter too large
5. Improper use of equipment
6. Defective anchorage material
7. Inexperienced bolting crew

Be safe . . . make sure you have a check on all of these by using Youngstown VTI Bolts. They are available in ⅝ and ¾-inch diameters, 28 to 84-inch lengths with 4-inch rolled threads.

Physical properties of Youngstown VTI Mine Roof Bolts meet or exceed Specification ASTM A-306 as outlined by the Committee on Roof Action. The Youngstown Sheet and Tube Company, Youngstown, Ohio. Carbon, Alloy and Yoloy Steels.



HOW THE YOUNGSTOWN VTI BOLT ASSURES SAFE ROOF PRACTICE

This is a VTI Roof Bolt with a non-self-supporting expansion shell, pal nut, and a bell-type roof plate with hardened washer. When tightened with an impact wrench, the VTI crimp flattens somewhere between 5,500 and 6,500 pounds tension. No crimp means a safe roof.

QUALITY YOUNGSTOWN SERVICE

Youngstown

Coal Patents (*Continued*)

Co., Chicago, Ill.), Aug. 25, 1959. Simplified and improved means for maintaining a uniform degree of tension on the trimmer chain of a boring machine adjustable to operate in seams of variable thickness. The upper and lower trimmer bars are vertically adjustable. No. 2,901,230.

Percussive core breaking device for boring type miners, L. D. Hagenbook (assigned to Goodman Mfg. Co., Chicago, Ill.), Aug. 25, 1959. Design for a percussive core breaker for a rotary boring head in which a rotatable disk, spaced radially from the axis of rotation of the head and movable in an annular path, successively engages the face of the core with a percussive and wedging action. No. 2,901,231.

Bit holder for cutter chain bits, C. H. Brown (assigned to Goodman Mfg. Co., Chicago, Ill.), Aug. 25, 1959. Simplified means for holding a cutter chain bit in its chain block, whereby use of the usual set screws is eliminated. In use, cutter forces acting on the bit serve to tighten it within the block, yet it can be readily released from the block when desired. No. 2,901,233.

Long wall mining machine using conveyor driven power take-off means, P. V. Malloy, Sept. 8, 1959. Apparatus for longwall mining wherein an endless conveyor extends along the mine wall and the coal is dislodged by a device driven from the conveyor belt. The frame of the conveyor serves as a track means for movement of the carriage of the dislodging device. No. 2,903,253.

Bituminous Output

YEAR TO DATE	PRODUCTION
Sept. 12, 1959	276,086,000
Sept. 13, 1958	270,674,000

1959 output 2.0% ahead of 1958.
A month earlier output was 3.8% ahead of 1958.

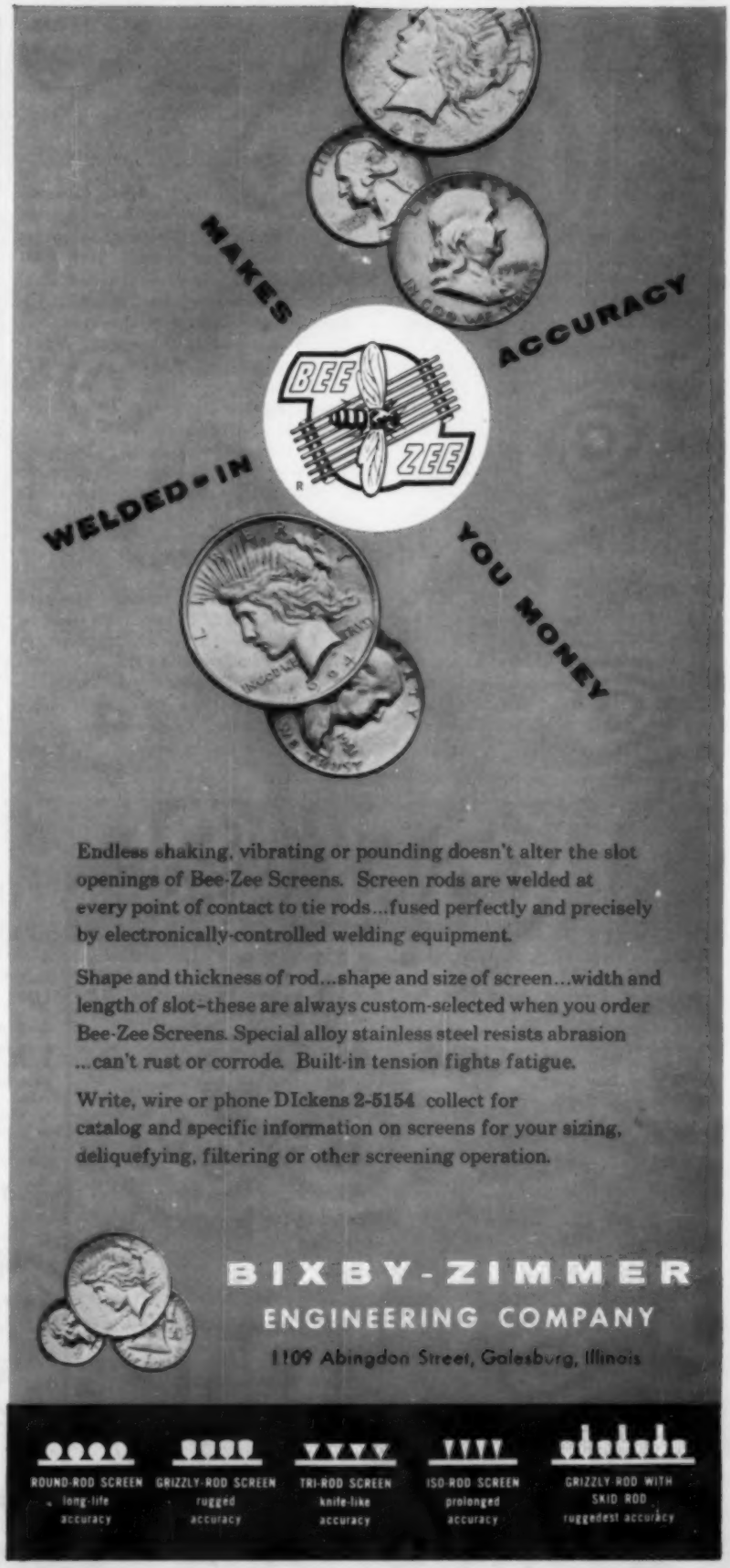
Anthracite Output

WEEK ENDING	PRODUCTION
Sept. 12, 1959	6,375,000
Sept. 13, 1958	8,457,000

YEAR TO DATE	PRODUCTION
Sept. 12, 1959	13,148,000
Sept. 13, 1958	14,506,000

1959 output 9.4% behind 1958.
A month earlier output was 8.4% behind 1958.

WEEK ENDING	PRODUCTION
Sept. 12, 1959	329,000
Sept. 13, 1958	475,000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BEE ZEE
WELDED-IN
YOU MONEY
Endless shaking, vibrating or pounding doesn't alter the slot openings of Bee-Zee Screens. Screen rods are welded at every point of contact to tie rods...fused perfectly and precisely by electronically-controlled welding equipment.
Shape and thickness of rod...shape and size of screen...width and length of slot–these are always custom-selected when you order Bee-Zee Screens. Special alloy stainless steel resists abrasion ...can't rust or corrode. Built-in tension fights fatigue.
Write, wire or phone DIckens 2-5154 collect for catalog and specific information on screens for your sizing, deliquefying, filtering or other screening operation.
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TRI-ROD SCREEN knife-like accuracy
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New Books

Fuel for Power

Steam-Electric Plant Factors is the National Coal Association's ninth annual report on comparative coal, oil and gas consumption statistics, and costs in the generation of electric power. This report provides, on an individual plant basis, as complete data as available from the Federal Power Commission on installed capacity, generation, fuel consumption and costs, and capacity of new plants. A new feature of the report are charts showing trends in utilities consumption of coal, oil and gas, and the "as consumed" cost per million Btu of these fuels by regions and the United States for the period 1952-1958. *34 pp. 11x17-in; paper. Free, NCA members; $1, non members. National Coal Association, Southern Building, Washington 5, D. C.*

Bulk Sampling

1958 Symposium on Bulk Sampling, sponsored by the ASTM committee on quality control, presents some current thinking on sampling problems. Four authorities discuss measurement error considerations, physical interpretation of coal sampling variances, the effect of increment weight on sampling accuracy, and ore car and abrasive grain sampling variation. *64 pp. 6x9-in; cloth. $2.25, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.*

Ground Movement

Proceedings of the European Congress on Ground Movement. Experts from Britain, France, Netherlands, Germany, Austria and Poland describe their findings on ground subsidence resulting from mining stratified deposits. Although the experts discuss surface movement, underground movement, laboratory experiments and theory, they emphasize the practical rather than the theoretical. Although reporting experience in widely separated coal fields, the authors note a similarity in experience. *272 pp. 8½x11½-in; paper. 2 guineas, Department of Mining, University of Leeds, Leeds 2, England.*

Cutting Insurance Costs

How to Cut Your Insurance Costs is a record of a special conference between editors of the McGraw-Hill publications and insurance specialists from American Mutual, Mutual Boiler & Machinery Insurance Co., and the Associated Factory Mutual Insurance Companies, at which ways and means for reducing insurance costs were discussed. Insurance experts offer pointers on cost control in the following fields: workmen's compensation, group accident and health, public liability, boiler and machinery, fire, and crime. *$1, Public Relations Department, American Mutual Liability Insurance Co., Wakefield, Mass.*

Alabama Mining Facts

Annual Statistical Report summarizes the activities of the Diivsion of Safety and Inspection, Alabama Department of Industrial Relations for the fiscal year 1957-1958. A major portion of the report deals with Alabama's coal industry, including mine laws, geology of the coal measures, descriptions of mining conditions and production figures. *133 pp. 6x9-in; paper. Department of Industrial Relations, State Office Building, Montgomery, Ala.*

How to Solder

Soldering Manual is the first manual on soldering ever published and combines the theoretical and the practical. In 21 chapters it deals with the following subjects: principles of soldering; soldering; fluxes; joint design; precleaning and joint preparation; equipment, processes and procedures; inspection and testing; alloys; coatings; printed circuits;

SIMPLEX MINE JACKS

6 WAYS BETTER

★ Ratchet lowering lever type for speed with safety
★ 5-tons capacity (other models to 35 tons)
★ Double-lever sockets permit lifting in close quarters
★ Full capacity on cap *OR GROOVED* toe
★ Safety Speed Trigger
★ Ideal for re-railing, repairs, skidding

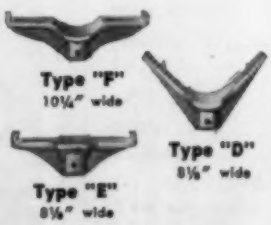
No. 84A for Thin Seams 14" high, 7" lift
No. 85A for Medium Seams 17" high, 10" lift
No. 86A for Thick Seams 20" high, 13" lift

Hi-Speed TIMBER JACK

MODEL NO. 642 LIFTS 6 TONS

Combines safety of screw jack with fast action of crank. Head swivels. Five models with min. ht. from 3'6", max. ht. to 9'6".

3 TYPES OF HEADS



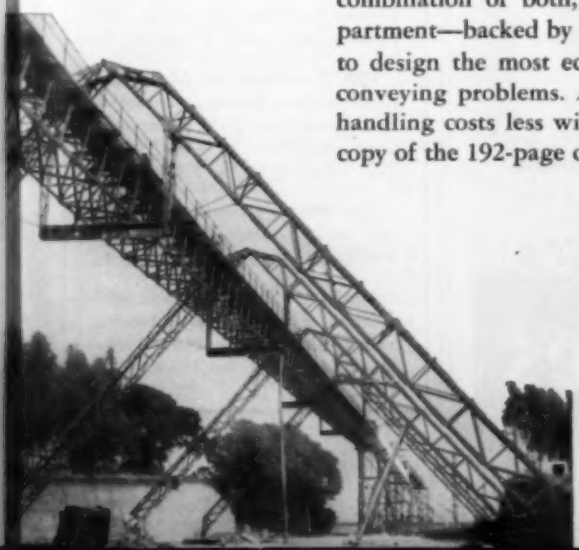
Write for Mines Bulletin for data on the most complete line of Mine Jacks

TEMPLETON, KENLY & COMPANY
WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS
2501 Gardner Road, Broadview, Illinois

with Barber-Greene specialized engineering

Whether your heavy-duty jobs call for all standardized components, all specially designed components, or a combination of both, Barber-Greene's engineering department—backed by 40 years' experience—stands ready to design the most economical answer to these special conveying problems. Any way you look at it, material handling costs less with Barber-Greene. Write for your copy of the 192-page conveyor catalog.

New Barber-Greene Heavy-Duty Idlers handle heaviest materials at high speeds. Heavy steel end brackets ribbed for maximum strength. Revolutionary grease seals most advanced in the industry.



59-16-PE

Representatives in Principal Cities of the World

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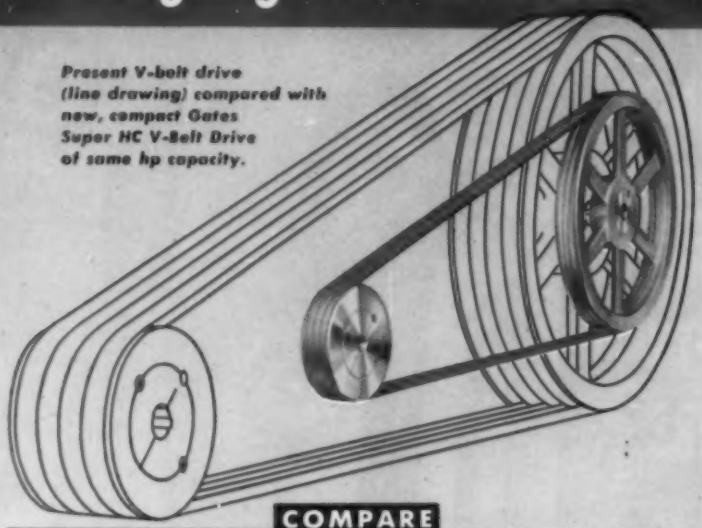
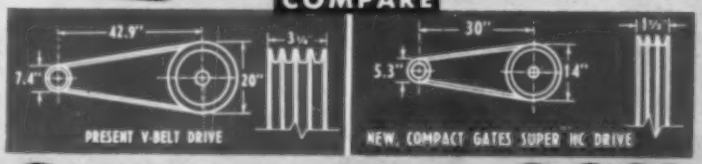
Designing NEW DRIVES?



Present V-belt drive (line drawing) compared with new, compact Gates Super HC V-Belt Drive of same hp capacity.

COMPARE



Save up to 20%

with new high capacity V-belt drive

When you change the whole drive — both V-belts and sheaves — remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.
World's Largest Maker of V-Belts

TPA 439

Gates SUPER HC V-BELT Drives

and safety. The practical man will find details on the latest techniques and what, when and how to solder. The engineer who is interested in the principles involved in setting up sound soldering schedules will find the information in detail. *176 pp. $5, American Welding Society, Department T, 33 W. 39th St., New York 18, N.Y.*

Meetings

American Institute of Electrical Engineers, Mining Section, Oct. 15—Morrison Hotel, Chicago, Ill.

Illinois Mining Institute, Oct. 16—Springfield, Ill.

National Safety Congress, Coal Mining Section, Oct. 19-21—Chicago, Ill. Subjects for discussion include the duties of the foreman, the block retreat system, dust collection and degasification of coal beds.

Penn State 7th Annual Workshop for Coal Industry Management, Oct. 25-30—White Sulphur Springs Hotel, Bedford, Pa.

AIME-ASME Joint Solid Fuels Conference, Oct. 27-29 — Netherland-Hilton Hotel, Cincinnati, Ohio.

West Virginia Coal Mining Institute fall meeting sponsored jointly by the Central Appalachian Section, AIME, Oct. 30 and 31—Greenbrier Hotel, White Sulfur Springs, W. Va.

Meeting of Pittsburgh Section of American Institute of Mining, Metallurgical & Petroleum Engineers and Pittsburgh Section of National Open Hearth Committee, Nov. 6, Penn-Sheraton Hotel, Pittsburgh, Pa.

Southern Coal Producers Association, Nov. 9—Roanoke, Va.

Kentucky Mining Institute, Fall meeting, Nov. 12-13—Phoenix Hotel, Lexington, Ky.

American Mining Congress, Coal Division Conference, November 13—Penn-Sheraton Hotel, Pittsburgh, Pa.

Fifth Symposium on Mining Research treating themes on ammonium nitrate explosives, field performance and safety, Nov. 19 and 20—Missouri School of Mines, Rolla, Mo.

Coal Mining Institute of America 73rd annual meeting, Dec. 3 and 4—Penn-Sheraton Hotel, Pittsburgh, Pa.

American Institute of Mining, Metallurgical & Petroleum Engineers, Inc., annual meeting, Feb. 14-18, 1960—New York, N. Y.

Equipment Approvals

Eleven approvals were issued in August.

Wilcox Mfg. Co.—Model WCM-EED-25 continuous miner; three motors, one 50 hp, one 10 hp and one 5 hp, 250 V, DC. Approval No. 2F-1486, Aug. 3.

National Mine Service Co.—Model BF-1 belt feeder (elevating chain conveyor); one motor, 15 hp, 250 V, DC. Approval No. 2F-1487, Aug. 10.

Goodman Mfg. Co.—Type 967C tractor tread loader; four motors, each 30 hp, 440 V, AC. Approval No. 2F-1488A, Aug. 10.

Wilcox Mfg. Co.—Model WCM-EEA-27 continuous miner; three motors, one 50 hp, one 15 hp and one 5 hp, 550 V, AC. Approval No. 2F-1489A, Aug. 11.

National Mine Service Co.—Type 48-54 Torkar shuttle car; one motor, 60 hp, 440 V, AC. Approval No. 2F-1490A, Aug. 11.

Galis Electric & Machine Co.—Model 300A rotary roof drilling machine; one motor, 20 hp, 250 V, DC. Approval No. 2F-1491, Aug. 12.

Wilcox Mfg. Co.—Model WCM-EEA-27 continuous miner; three motors, one 50 hp, one 15 hp, and one 5 hp, 220/440 V, AC. Approvals Nos. 2F-1492 and 2F-1492A, Aug. 17.

J. H. Fletcher & Co.—Model DJF-13XH,C2,S8 roof control drill; one motor, 50 hp, 500 V, AC. Approval No. 2F-1493A, Aug. 21.

Columbus-McKinnon Chain Corp.—Model RF-55 ratio feeder conveyor; one motor, 15 hp, 440 V, AC. Approval No. 2F-1494A, Aug. 24.

Fred's Welding Service — Model HD-5P battery-powered utility truck; one motor, 1½ hp, 36 V, DC. Approval No. 2F-1495, Aug. 24.

Mine Safety Appliances Co.—Type S rock dust distributor; one motor, 7½ hp, 250 V, DC. Approval No. 2F-1496, Aug. 31.

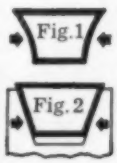
In addition to the above permissible equipment, acceptance designation No. 28-27 was assigned to C. R. Daniels, Inc., to identify conveyor belts that have been accepted by the Bureau as being fire resistant.

Need REPLACEMENT V-BELTS?

Improved Gates Vulco Rope gives you 2 important advantages

1. 40% higher hp rating at no increase in price: This important cost-saving advance is the result of Specialized Research in the world's largest belt-testing laboratories at Gates. **As replacements on standard drives these V-belts with 40% more load-carrying ability give longer service life...reduce down-time, cut belt replacement costs.**

2. Concave Sides (U. S. Pat. 1813698): The sides of Gates Belts are concave (Fig. 1). When the belt is bent around the sheave, the concave sides fill out—become straight—for full, uniform contact with the sides of the sheave groove (Fig. 2). Uniform contact insures maximum pulling power...even distribution of wear...longer life.



Available in all sizes from your nearby Gates V-Belt Distributor listed in the Yellow Pages of your phone book.

When designing new drives
use Gates new Super HC V-Belts and Sheaves.
See opposite page.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.

World's Largest Maker of V-Belts

Gates

TPA 432

Gates Hi-Power VULCO ROPE V-Belts

Is corrosive mine water gnawing away at your profits?

If you're replacing pipe frequently, then corrosive mine water is getting fat at your expense. And, that's a diet you can't afford. Why not install USS National Polyethylene Pipe, and put an end to your pipe replacement problems?

USS National Polyethylene Pipe resists attack from corrosive mine water, acids, alkalies, salts, and other mine chemicals. What's more, it's light, flexible, easy to install, and won't crack—even at sub-zero temperatures, down to −90°F., and up to +120°F.

It's available in sizes from ½ inch to 6 inches in diameter, and in a variety of wall thicknesses. Remember, polyethylene pipe is the most economical pipe that can be used for mine drainage. For more information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. *USS and National are registered trademarks*

This seal of the National Sanitation Foundation means Tested . . . Approved . . . Sanitary!

USS National Polyethylene Pipe

National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
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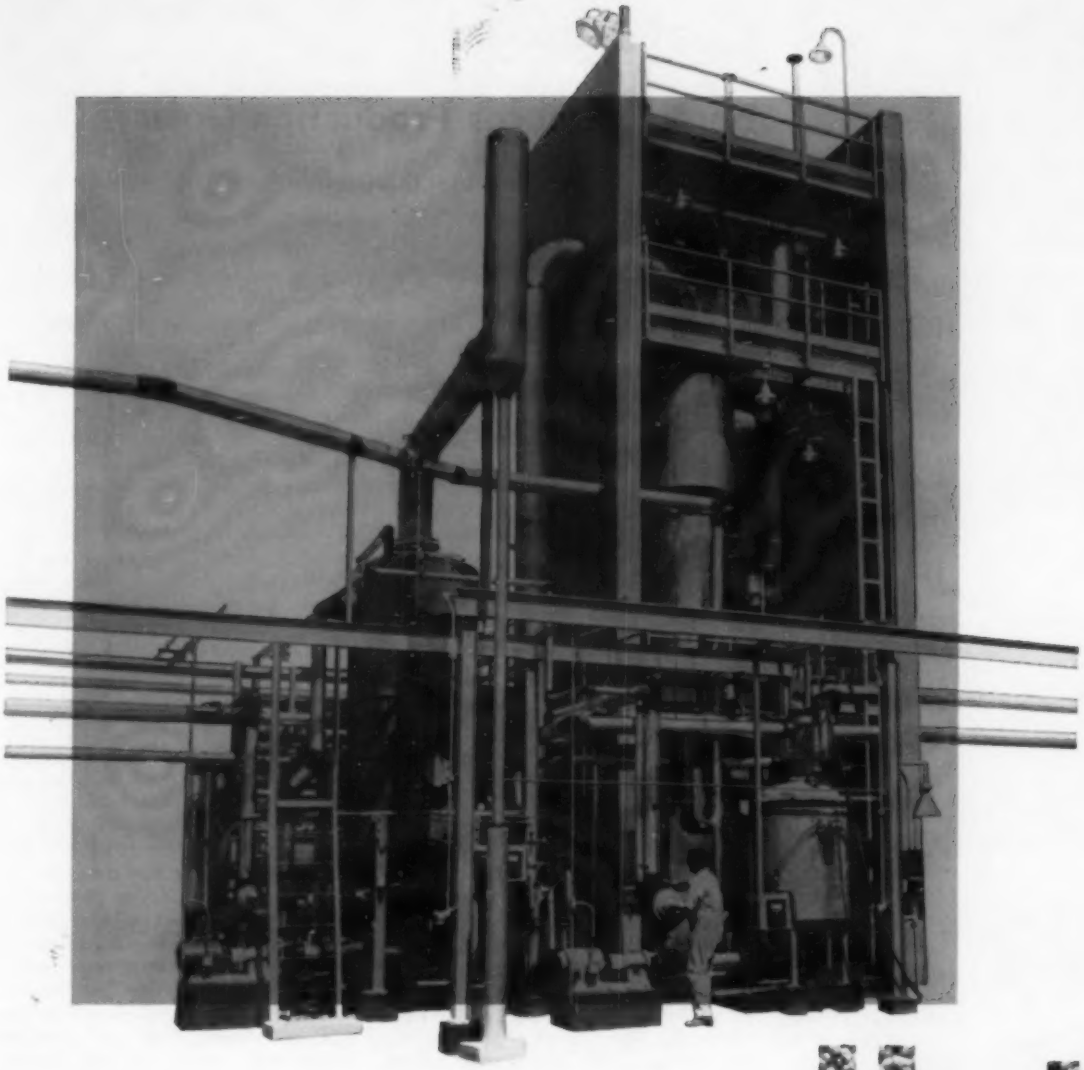

Now Ammonium Nitrate in pellets

New $5,000,000 Atlas Plant
Produces Unique, Improved Blasting Agent

Atlas is now producing low cost Ammonium Nitrate in a new pelleted form designed especially for blasting. Atlas Pellets give oil absorption equal to prills, and flow freely for fast loading into all types of blast holes. The new blasting agent is being made in the new $5 million Atlas acid and ammonium nitrate plant near Joplin, Mo.

Not a granule, not a prill, Atlas Pellets are porous but compact particles which, when oiled, have both the density and sensitivity required for efficient low cost ammonium nitrate blasting. They are the latest advance in developing new products and techniques to help the user of explosives gain lowest possible blasting costs. Your Atlas representative can help you put these products and techniques to profitable use in your operation.

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Large Penn. Mine
SAVES $75 DAILY
on 3-Shift Operation
With Efficient NOLAN
AUTOMATED SYSTEM
• Automatic Loading Station
• Porta-Feeder
• Hold-a-Trip

NOLAN Automatic Loading Station (at top) with NOLAN Hold-a-trip in distance

Trip being fed by NOLAN Porta-Feeder

(at left) NOLAN Automatic Loading Station

(below) NOLAN Hydraulic Porta-Feeder

(below) NOLAN Hold-a-Trip

NOLAN

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George C. Hutchinson, Jr., 800 Koppers Building, Pittsburgh, Pa.; Huntington Supply & Equipment Co., 423 First Huntington Nat'l Bank Bldg., Huntington, W. Va.; E. C. Horne Machinery Co., 1726 Champa Street, Denver 2, Colorado; Frank C. Hammatt, P.O. Box 154 Castle Gate, Utah; J. L. Thomas, 429 South 24th Street, Birmingham 5, Alabama; John North Associates, P.O. Box 105, Herbert, Mich. (Chicago District); Levitt Safety Limited, Toronto 10, Canada.

THE NOLAN COMPANY
106 Pennsylvania St. Bowerston, Ohio

Coal Abroad

Britain Reduces Production Goals

National Coal Board, with 30 million tons of unsold coal on its hands, will close many mines.

A newly revised plan issued by Britain's National Coal Board is designed to cut the 1965 coal output target from 240 million tons down to between 200 and 215 million tons.

To keep production in line with this new estimate of 1965 demand, the Board will close "on economic grounds" at least 35 and not over 70 mines and reduce the 660,000-man labor force by anything from 35,000 to 85,000 men.

The Board believes that these moves along with 170 "normal closures" because of exhaustion of seams or other technical reasons, and a reduction of opencast sites from 100 to 2 (Westfield in Scotland and Radar in Northumberland) should keep the level of production equal to demand.

Next year will see 39 "normal" closures, 6 "economic" closures, and 3 partial "economic" closures. With opencast cutbacks, this should reduce total coal production by about 8.5 million tons, eliminating the need for further stockpiling after the first of the year.

One expected result of the new plan is an increase of manshift production by 7½ to 10 percent by 1965.

The National Union of Mineworkers has submitted no alternative proposals as yet, but is expected to be highly critical, scrutinizing particularly the "normal" closures.

USSR—The Russians report they have a new-type conveyor for small solid objects such as coal, ore or rock. The device, able to turn 120 deg around its anchored base is described as having an hourly capacity of 120 cu meters (4,237.7 cu ft) and a maximum reach of 50 meters (164.04 ft). The center point of the conveyor is anchored 6½ ft deep into the ground. Three metallic pillars support the upright column and the turntable, the drive motor for the turntable and the electric apparatus for the conveyor belt. The upright column is connected to the extension which carries the belt through 5 steel cables. Operating on a maximum incline of 18 deg, the extension can be lowered by a steel cable and driven cable drum set. The conveyor belt has a 700 mm (27.5 in) reach and travels 3.28 ft per sec. Use of the unit is claimed to permit, in connection with a feed conveyor system, the spreading of the solid material over a wide arc, permitting the accumulation of high piles at low energy demand.

AUSTRIA—Eleven hundred W. German "Volkswagenes" will be shipped by the SS "Linzertor" to the United States on each of the 12 annual Atlantic crossings, and then it will take 800 metric tons of American coal back to Austria. The "Linzertor" is the first of 4 vessels planned by "Vereinigte Oesterreichische Eisen- und Stahlwerke A.G." The second unit, to be named "Wienertor" will be slightly larger and faster and will be fitted with special gear to accommodate 1,100 Volkswagens and make room for American coal on return voyages.

POLAND—A fierce quarrel is in progress in this nation between representatives of the coal mining industry and those of the metallurgical field. The latter demand the import of high-grade coking coal and the first group opposed such a move, says Zcycie Gospodarske, a Warsaw economics weekly. Demand for coking coal has been rising steadily. Twenty coking batteries were opened during the decade from 1949 to 1959 and the total capacity thus rose from 5,300,000 metric tons to 10,000,600 metric tons. Most important development is the increase in metallurgical coking coal from 2.6 million in 1949 to 7,100,000 metric tons this year. But despite the intensive development of the coke and metallurgical industry it was not accompanied by increases in the output of coking coal. Under investment in this branch of the coal industry is blamed for this shortage.

HUNGARY—Output of coal in this nation doubled from 1948 to 1958, but the actual caloric gain remained below the output increase. The decrease in the average rating of 3.983 kcal/kg in 1948 to 3,355 kcal/kg in 1959 accounted for an increase of only 74% during the 10 yr period. Hungary's per capita quota in coal production thus ranges at only 60% of the European average.

CZECHOSLOVAKIA—The Czech Fuel Ministry announced an overall output increase of 3% during the first half of 1959 as compared to the same period of 1958. This is not up to the overall industrial output which has increased 11%.

New Morton "Formula 5" with rust inhibitor protects your coal and your equipment

Now more economical than ever to use!

"Formula 5" is the safest, most effective freezeproofing compound you can buy. It is specially made to meet the requirements set up by coal producers. "Formula 5" features a rust inhibitor and a new easily distinguishable blue color.

Unlike ordinary freezeproofing compounds "Formula 5" has a rust inhibitor added to protect you and your customers against corrosion of cars, motors, conveyors and other equipment.

Effective even at sub-zero temperatures, "Formula 5" not only keeps coal free-running for your customers, it also is ideal for use anywhere around your mine where icing is a problem.

"Formula 5" is easy and economical to use.

In addition to being a multi-purpose freezeproofing compound, "Formula 5" needs no mixing, no special handling. It won't cause costly delays by caking or lumping in feeders. It's a free-flowing product composed of chemically treated sodium chloride (30-70 mesh) and a special, new improved anti-corrosive compound. Just apply dry, direct to coal.

"Formula 5" is treated to produce an ideal dissolving rate so that little of it is lost during initial drainage. This means more effective, more economical freezeproofing.

Send for free booklet, "The Key To Low Cost Effective Freezeproofing." If you would also like a Morton Consulting Engineer to assist you with freezeproofing and equipment maintenance problems, without cost or obligation, write:

MORTON SALT COMPANY
INDUSTRIAL DIVISION

Dept. CA-10, 110 No. Wacker Drive, Chicago 6, Illinois

Preparation Facilities

Fairbanks Whitney Corp., Pennsylvania Coal & Coke Div., Heshbon, Pa.—Contract closed with Wilferd L. Roller Co. for a 50-tph prefabricated heavy-media washer to handle 4x¼ coal.

Pais Pocahontas Coal Co., Keystone, W. Va.—Contract closed with Wilferd L. Roller Co. for additional dry screens to fully load existing Roller heavy-media washer.

Locust Valley Coal Co., Mahanoy City, Pa.—Contract closed with Wilferd L. Roller Co. for installation of an Ohmart Gama Ray specific gravity recorder and a specific gravity control for existing Roller heavy-media washer; to handle 200 tph of nut to No. 4 size anthracite.

Pocahontas Fuel Co., Deerfield plant, Wyoming County, W. Va.—Contract closed with Fairmont Machinery Co. for a refuse water clarification system consisting of thickener pumps and related equipment; to treat 3 tph refuse.

Slab Fork Coal Mining Co., Mine No. 2, Slab Fork, W. Va.—Contract closed with The Deister Concentrator Co., Inc., for 4 Concenco No. 77 twin-deck Diagonal-Deck washing tables, 4 two-way splitters and 1 Concenco revolving feed distributor Model 108-B.

The Pine Oaks Coal Corp., Hurley, Va.—Contract closed with K. Prins & Associates for 100-tph standard coal washer with refuse conveyor and water circulating pump to handle 6x¼ coal.

Armco Steel Corp., Montcoal, W. Va.—Contract closed with Kanawha Mfg. Co. for froth flotation cleaning circuit comprised of 12 No. 66 Wemco Fagergren cells, 1 Bird Humboldt dryer; capacity 36 tph solids in raw feed.

Red Parrot Coal Co., Prenter, W. Va.—Contract closed with Kanawha Mfg. Co. for truck unloading and blending bins with 2 mechanical adjustable reciprocating feeders and inclined belt conveyor to deliver coal to existing plant; capacity variable from 100 to 400 tph.

Lake Superior Coal Co., Superior, W. Va.—Contract closed with Kanawha Mfg. Co. for storage and blending facilities comprised of Lecco-vib heavy-duty picking table, two 600-ton circular fabricated steel bins, remote controlled motorized gate on top bins, reciprocating feeders under bins, two 200-ft long communicating belt conveyors; capacity, 350 tph.

Slab Fork Coal Co., Mary Gaston, W. Va.—Contract closed with Kanawha Mfg. Co. for fine coal cleaning addition to existing jig washing plant consisting of 4 Deister No. 77 Double-Deck tables, Allis-Chalmers low-head dewatering screens and Wemco Torque Flow pumps. Capacity rated 80 tph of ⅜ x ⅛ coal.

The Youngstown Mines Corp., Dehue, Logan County, W. Va.—Contract closed with Nelson L. Davis Co. for replacement of a Neldco heavy-media separatory vessel by one of modern design with latest auxiliary equipment to handle 250 tph of 5x¼ raw coal.

Buckeye Coal Co., Nemacolin mine, Carmichael, Pa.—Contract closed with Nelson L. Davis Co. for replacement of Neldco heavy-media separatory vessel with modern equipment to handle 225 tph of 5x¼ coal.

HANDY CONTROLS FOR . . . *one man operation*

Men like a *safe* mine . . . Inspectors like a *clean* mine . . . Operators like economical operation . . . Such as given by the . . .

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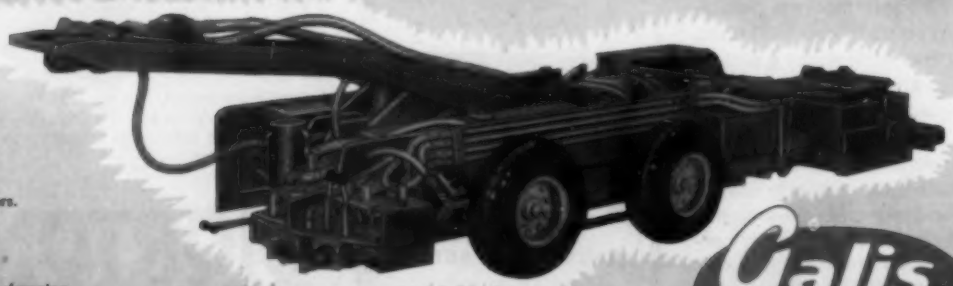

Greatest Drilling Speeds
156-42" bolts in 5 hrs. (Name on request.)

Greatest Economy
No stopping for changing head parts.

Greatest Maneuverability
Three point suspension, 4 wheel drive, each side positive control.

Dimensions:
Overall height, 24". Ground clearance, 5". Overall length with cable reel, 174". Overall length without cable reel, 160". Overall width, 61" over wheels. 5" stabilizing jack. Standard feed length, 53". Oil Tank capacity, 60 gals. Available H.P., 15.

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KAISER ALUMINUM MINING PIPE DRASTICALLY REDUCES INSTALLATION AND HANDLING COSTS UNDERGROUND!

Ideal for compressed air lines; spray water lines; mine drainage, filtration and disposal; fuel, steam and water supply lines.

With the emphasis on mine modernization, continuous mining and improved production methods, leading mine operators are finding that Kaiser Aluminum mining pipe meets their needs as no other pipe can. Here's why:

1. Reduced Costs. Aluminum pipe drastically reduces installation costs underground because it's lightweight, easy to cut and fit (even in the overhead position), and requires a minimum of supports or hangers. And, if you use Schedule 5 aluminum pipe in your system, its initial cost is actually less than T&C Schedule 40 steel pipe.

2. High Speed Installation. Quick connecting couplers and fittings assure the fastest pipe line service for air, spray water or drainage lines. Of particular importance in accelerated mining operations, down-time waiting for air or spray water is minimized.

3. Strong, Durable. Kaiser Aluminum mining pipe is made of high strength aluminum alloys to take rough treatment and handling. It easily withstands normal pressures used in mining operations and resists the corrosive attack of mine atmosphere. It won't collapse under vacuum, won't become brittle when exposed to low temperatures.

The advantages of Kaiser Aluminum mining pipe make an important contribution to the coal industry's rapid rate of increased production efficiency. To get all the details on how this strong, lightweight pipe can improve your mining operations and save you money, contact us for the name of your nearest Kaiser Aluminum mining pipe distributor.

For complete information on pipe schedules, sizes, weights and strengths—mail in the coupon now for our free, illustrated booklet, "Kaiser Aluminum Mining and Construction Pipe." Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California.

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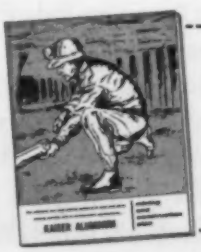
See "Maverick" • Sunday Evenings, ABC-TV Network
Consult your local TV listing



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TWO DRAVO-3200 "CHOTINS" JOIN RIVER SERVICE

Irene Chotin and *Joey Chotin,* Dravo's two newest stock 3200-hp towboats, are now in service pushing high speed petroleum tows. Both boats are designed with the Dravo Precision-Balanced Propulsion concept, and are backed with the proven performance of previous Dravo-3200's. They are 148 feet long, 34 feet wide, and 10 feet 6 inches deep. Two more stock 3200's are under construction and will be available soon. For full details on how one of these Dravo-3200 towboats can benefit you, contact Marine Department, Dravo Corporation, Pittsburgh 25, Pennsylvania.

PRECISION PBP BALANCED PROPULSION

DRAVO
CORPORATION

Style GR, cylindrical insert

HR Style, 1½" gage stop

JN for continuous miners

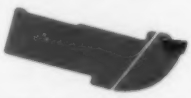
HJN recovery auger bit

C Style, straight shank

Style GN, notched shank

JC Colmol and Boring bit

GV, for Joy GV-6111 chain

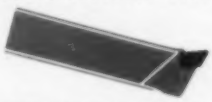


KN Style, chisel-nose tip

HN Style, 1½" gage stop

Style A straight shank

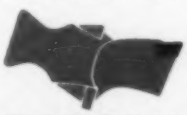
Style C for impurities



Style D for coal, potash, salt

Style E for Goodman Borers

Style CC, milled shank



L Style for Bowdil ML chains

CARMET OFFERS 25 STYLES OF MINING TOOLS

for every condition you have

Carmet carbide mining tools get high-tonnage production because they're precision made to meet specific mining operations. Hard, tough grades of carbide are induction brazed to high alloy, heat treated shanks in a way that insures maximum tool life. Cutter bits are designed for shortwall, longwall, universal machines and continuous miners of every make. Drill bits drill clean, straight holes at fastest speeds. Carmet distributors keep a complete line of Carmet Mining Tools in stock for prompt delivery. Carmet field engineers are always on call to help you solve tool problems and cut mining costs. Take advantage of their know-how now.

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Drillmaster Supply & Mfg. Co., Evansville, Ind.
Gladstein Co., McAlester, Oklahoma
Marion Mine & Mill Sup. Co., Whitewell, Tenn.
McCombs Sup. Co., Jellico, Tenn.; Harlan, Ky.
Oglebay, Norton Mine Supply Div.,
Offices: St. Clairsville, Ohio;
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Persinger Supply Co., Williamson, W. Va.
Persinger's Inc., Charleston, W. Va.
Union Supply Co., Denver, Colorado
U. S. Steel Supply Co., Pittsburgh, Pa.
W. B. Thompson Co., Iron Mountain, Michigan
Vanguard Equip. & Supply, Chicago, Ill.

The newly revised 5th Edition of the Carmet Mining Tool Catalog contains application data and specifications on the complete line of Carmet Mining Tools, including a complete section on grinding and reconditioning. For your copy, write Carmet Division, Allegheny Ludlum Steel Corporation, Detroit 20, Michigan.

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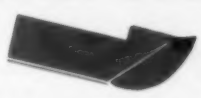
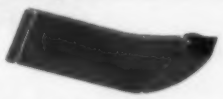


N Style special clearance bit



O Style for rotary head miners

R Style finger bits

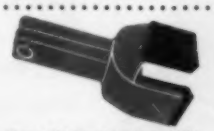
Style UL coal drill

Style VL drill bit

W Style for friable seams

WW Style, power and hand drilling

T and TT Styles for roof bolting



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The Original DOUBLE-BONDED Carbide Cutter Bit

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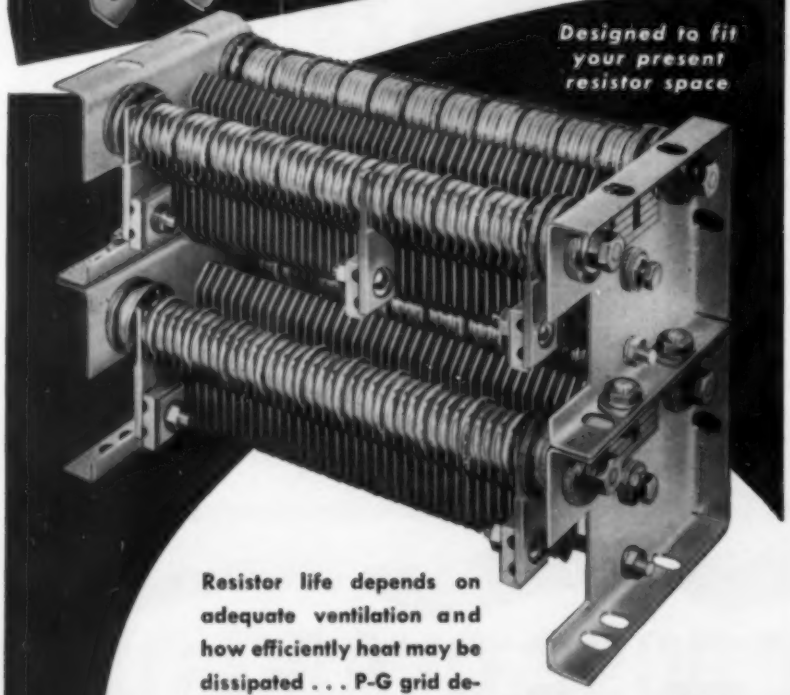
Resistor life depends on adequate ventilation...

Patented P-G Grid Design assures maximum ventilation



Designed to fit your present resistor space

Resistor life depends on adequate ventilation and how efficiently heat may be dissipated . . . P-G grid design equalizes the amount of air space surrounding each leg or loop to obtain even heat throughout the grid area. (Note illustration.) . . . Since heat is rapidly and evenly dissipated, hot spots fail to develop and longer resistor life is assured . . . For a nonbreakable resistor (only steel and mica used) specify P-G on your next application.

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The Nonbreakable Steel Grid Resistor

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News Roundup *(Continued)*

Mines and Technical Surveys (read by Dr. Swartzman).

"Relation of Coking Properties and Compaction to Quality of Coke Briquets Made From Mixtures of Coal and Inert Materials," Dr. Swartzman.

"Synthetic Coke From Subbituminous Coal," Edward Prostel, Natural Resources Research Institute, University of Wyoming, Laramie.

"A New Method for the Controlled Carbonization of Briquets," J. S. Harrison and D. G. Madley, National Coal Board (presented by Dr. Gordon).

"The R-N Direct Reduction and Beneficiation Process," R. P. Smith, R-N Process Corp., New York.

"Specific Gravity Determination of Coal Briquets With an Analysis of the Variance," Frank Odasz, Husky Oil Co., Cody, Wyo.

"Combination Asphalt and Briquet Manufacture," Paul Takar, Hungarian Petroleum & Gas Research Institute; G. Aszmann, Briquet Corp. of Hungary; and J. Toth, Coal Exploration & Enrichment Co., Hungary (presented by Mr. Rice).

"Energy for Tomorrow," Ivan A. Given, *Coal Age* (at the convention dinner, with Mr. Landers as toastmaster).

Some of the conclusions—tentative or firm—reached by the contributors were:

Coal for briquetting must have suitable coking properties, and some coals can be improved by adding coking grade. On size there is an optimum one for maximum packing density and resistance to crushing in the press. Dust is not the problem it once was thought to be. Size distribution is the more important. Better dispersion and atomizing of binder increases briquet strength. High moisture in coal cuts strength and stability.

In binderless briquetting at high pressures and temperatures it has been found that fusion is needed, not solely compaction. At 400 to 650 C and 12.7 tons, lignite and subbituminous can be briquetted as is. With medium and high-volatile coal and anthracites, on the basis of laboratory experiments, it is necessary to add inert material to get the coal to agglomerate. A major property is the initial volatile matter.

Rising output of small coal in Great Britain, in addition to air pollution, is increasing interest in briquetting and stimulating research into improved methods. Binderless briquetting would be a major aid, and experimental work indicates that supplementing pressure with shear by various methods develops maximum strength. Carbonization of briquets can provide a smokeless or metallurgical-grade fuel but is expensive. Search for a cheaper process in Great Britain has led to the use of heated sand in a retort. (to p. 63)

Coal Preparation Plants built in '59

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. . . and now under construction!

1. Westmoreland Coal Co., Hampton No. 4 Preparation and Thermal Drying Plant . . . 440 TPH of 5" x 0 coal.
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4. Massey Coal Mining Co., Ben Creek No. 2 Preparation Plant . . . 120 TPH of ¼" x 0 coal.

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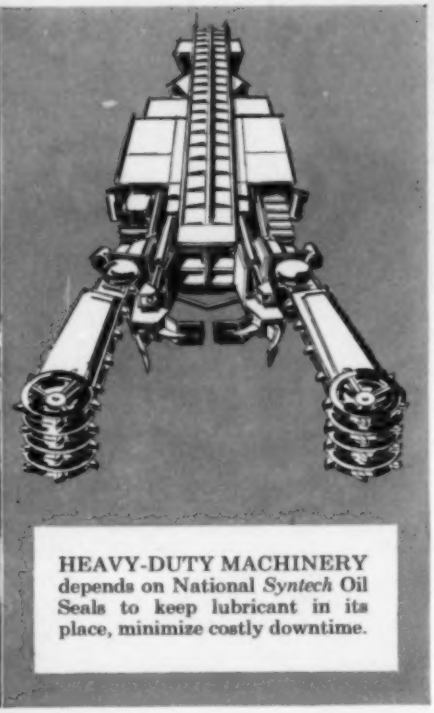

HEAVY-DUTY MACHINERY depends on National *Syntech* Oil Seals to keep lubricant in its place, minimize costly downtime.

National "prescription-blends" a synthetic just right for the heavy-duty oil seals you need

National *Syntech* Oil Seals feature: 1. Synthetics "prescription-blended" to meet specific operating conditions; 2. Minimum tension on garter spring to reduce shaft-torque, increase seal life; 3. Accurately sized O.D.'s.

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Temperature extremes, shaft speeds, solvent-, fatigue- and abrasion-resistance—these and other factors go into choosing the *best* synthetic for a heavy-duty oil seal. National can "prescription-blend" a **Syntech** seal just right for *any* job!

Basic ingredients for synthetics developed and perfected by National are compounded by coded formulas. Each batch is mixed and blended separately, then tested and approved before release. A finished "prescription" is extruded, bonded and molded . . . machined to size and assembled into **Syntech** seals that'll save time and money in your machines and equipment.

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NATIONAL OIL SEALS

Briquettes (*Continued*)

Addition of a plasticizing agent, decreasing the size of the coal and increasing the temperature at which briquetting is done can result, on the basis of laboratory investigation, in a stronger briquet. Where briquets include an inert material, as, for example, for use in a smelting process, coking coal, because of its characteristic of softening and resolidifying, is a logical agent to promote bonding and compacting, within limits. The strength of the final product rises with the fluidity of the coal under heat; also the higher the fluidity the greater the percentage of inert material that may be used.

Synthetic coke may be produced from subbituminous coal by charring the coal (devolatization), briquetting it and then carbonizing the briquets. Carbonizing represents an added cost but in certain areas the higher cost of the product may be less than standard coke. Slow carbonization is the secret of a good product.

Sells Properties

Truax-Traer Coal Company announced Aug. 27 the sale for cash of all physical properties in its West Virginia Div. to Oglebay Norton Company of Cleveland, Ohio, subject to the approval of its stockholders at a special meeting scheduled for September 28.

The property comprises nine operating mines with coal preparation plants at Kayford and Ceredo, together with substantial reserves of metallurgical coal. Main areas are located in Boone, Kanawha, Raleigh and Wayne Counties, West Virginia. The large-capacity preparation plant at Ceredo, located on the Ohio River, includes rail-to-water loading facilities. Oglebay Norton will also take over in the transaction the Cincinnati sales office of Truax-Traer.

Reasons—Truax-Traer is expanding its strip mining operations in the Midwest area. The proceeds of sale, reports the firm, will contribute to the further development of large coal reserves in Illinois and North Dakota to serve the increasing demand for utility and industrial steam coal. The company says it is actively pursuing development of mines to serve large thermal generating stations located at the mine site.

Oglebay Norton Company owns and operates deep coal mines in West Virginia and Ohio, producing steam, domestic and by-product coals. It also acts as sales agent and broker for mines producing coal in Ohio, West Virginia, Pennsylvania and Kentucky.

Acquisition of the Truax-Traer West Virginia properties are expected to supplement Oglebay Norton's coal reserves and operations.

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- Roller Bearings on Countershaft; Split Bronze Bearings on Roll Shaft.

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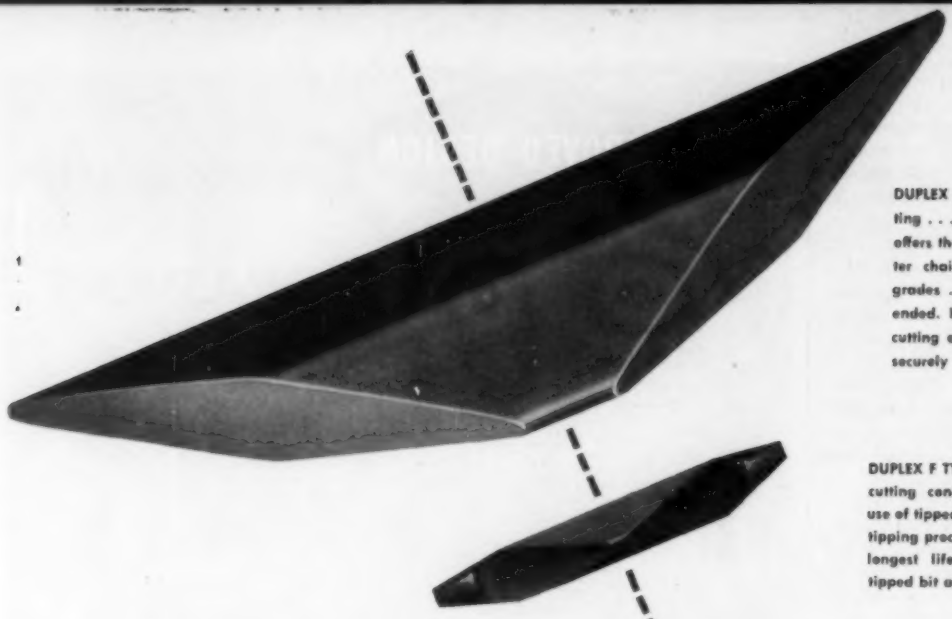

DUPLEX C-11 . . . for all purpose cutting . . . this superior CINCINNATI BIT offers the best obtainable value in cutter chain bits. Available in various grades . . . is reversible and double ended. It has sharp points . . . keen cutting edges . . . long life . . . locks securely . . . easily removed.

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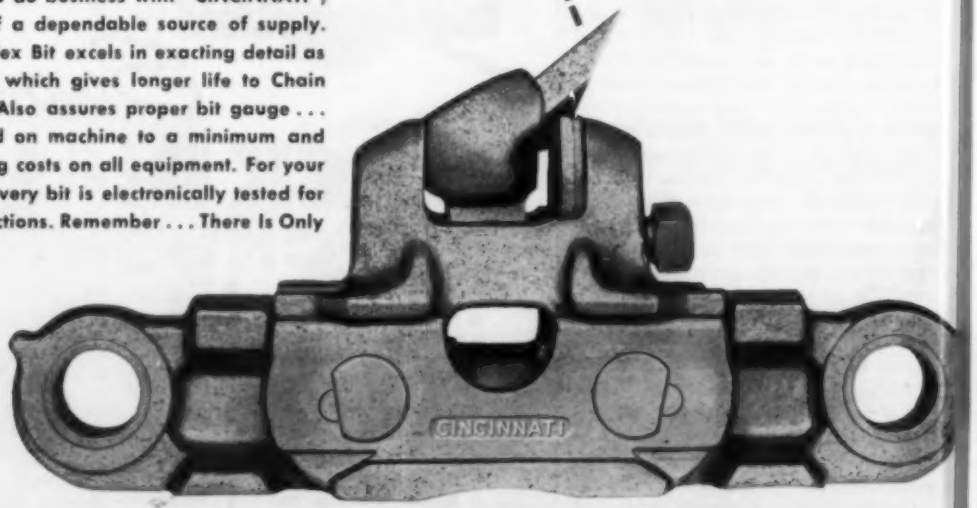

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69. Three years of testing in actual production have proved a new thermoplastic to be a successful substitute for nonferrous metals in the die-casting of over 500 products including instrument housings, machine parts, plumbing fixtures and bearings.

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70. Radar domes eighty-four feet in diameter that will withstand gale-force winds are being made of reinforced paper.

&

71. An engine that sprays a jet of water into the air is said to be applicable to boats of all sizes and to increase the speed of planing hulls by seventy-five per cent.

&

72. A two-unit antenna for a radio telescope (in which one unit reflects into the other) is being built at about one-tenth of the cost of a comparable dish-type antenna.

&

73. An inventor claims that his newly patented polarizing glass transmits eighty per cent of light and might solve the problem of polarized headlights.

&

74. A typewriter-size electronic computer is said to be able to make most of an engineer's routine calculations.

&

75. An all-metal tire for high-altitude aircraft is being tested. It is in the form of a circular wire brush and is said to have the same deflection characteristics as a pneumatic tire.

&

76. To use a new powdered paint the object to be coated is heated and dipped in the powder which melts and adheres in a film.

&

77. A new solution for photographic developing replaces three solutions now commonly used and is said to reduce development time to six minutes.

78. A unique television camera uses sound waves instead of light and can reveal the inner structure of materials or machines.

&

79. Drawings, pictures or writing can be transmitted by facsimile in scrambled, unintelligible form and reproduced as they were originally by a special receiver.

&

80. Sixty-five per cent of heat rays are reflected by a new plate-glass without serious loss of transparency. It is made by coating the surface with a film of metal sixteen millionths of an inch thick.

&

Further information on these news items and on Simplex cable is available from any Simplex office. Please be specific in your requests.

&

81. Any desired illumination level can be maintained with a new light control that automatically adds the right amount of artificial light to natural daylight.

&

82. Ordinary television sets may now be used in boats or automobiles by equipping them with a new transistorized inverter that converts 6 or 12-volt DC to 60-cycle, 115-volt DC.

&

83. The Navy's new radio telescope, to be built in West Virginia, will have a theoretical range of thirty-eight billion light years, nineteen times that of the two-hundred inch optical telescope on Palomar Mountain.

&

84. A pulse transformer to supply energy to underwater sonar transducers, can withstand a pressure of 15,000 pounds per square inch at 36,000 feet below sea level.

85. Plans have been made for a nuclear-powered blimp which could be in operation by 1963.

&

86. A pocket-size hi-fi tape recorder is battery operated, weighs only three pounds and can be carried in the pocket.

&

87. A new application of ultrasonics is a device that drives rats away with sounds inaudible to humans.

&

88. A solar generator is being used to charge an electric fence. It has a battery for use on dark days.

$40 Million Cable Laying Project Completed

Placement of the first deep-sea telephone cables linking the New World directly with continental Europe have been successfully completed by two cable-ships including HMTS Monarch, shown here at the Simplex Wire & Cable Co. docks at Newington, New Hampshire.

The new, 2,400-mile twin-cable transatlantic system, recently placed in public service, will provide thirty-six voice circuits between the U. S. and continental Europe.

All cable for the American-made segment of the system was manufactured by Simplex.

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Seven men were indicted on charges of involuntary manslaughter in connection with a cave-in that killed 12 coal miners last Jan. 22 at a Knox Coal Co. mine in Pittston, Pa.

A state investigation of the disaster, which occurred when the Susquehanna River tore through the mine wall, said operators of the Knox mine had been negligent in permitting miners to go into sections not properly protected.

The Central West Coal Co. has announced plans for operating a new mine in the Blackwater coal field in northern West Virginia.

The mine, near the Allegheny Front and around Stoney River, is one of the largest blocks of commercial quality coal left in the country, according to the firm. To help develop the field, the Western Maryland R.R. Co. is completing trackage of approximately 10 mi in length. The new field will be strip mined and Central West also has a 2,000 tpd deep mine under development.

Considerable opposition from coal companies in the anthracite region is expected on the bill now before the Pennsylvania state legislature requiring coal firms to fill 50% of an abandoned stripping and backfill the rest of it at an angle of 45 deg to the surface.

The measure has already won House approval, 152 to 35. Public safety and saving of sites for housing and industry are key reasons given by those in favor of the bill.

Utilization

Kentucky laid Sept. 9 the first strip of highway using a coal-base mixture. Nearly a mile of U. S. 460 east of Frankfort was paved as more than 100 state officials and representatives of Curtiss-Wright Corp. watched. Curtiss-Wright, which developed the new binder, believes the material will require about 2,000 to 2,200 tons of coal per mile. It is expected that the binder's slightly higher cost than ordinary surface paving will be offset by less maintenance costs. The surface is reported to be less slippery and not as subject to extreme temperature changes as present materials.

The federal government saves nearly half a million dollars annually by heating the White House, the Capitol and other federal buildings with coal, according to John Sherman Cooper (Rep., Ky.).

The Senator said that the government uses 315,000 tons of coal a year in its 4 main heating plants and "yet the nation's capital, as we all know, is recognized as one of the cleanest, most beautiful cities in the world." He added that his information "should come as a revelation to those under the mistaken impression that bituminous coal is an old fashioned fuel, unable to meet the demands of the mid-20th century market."

Engineering contracts for a new blast furnace at the Cleveland Works of Jones & Laughlin Steel Corp., the largest ever constructed in the steel industry, according to reports, have been awarded to Arthur G. McKee & Co.

The furnace, which will cost over $26 million, is a part of a $50 million expansion and cost reduction program "to equip the Cleveland plant as one of the most modern in the country," said J. R. Powell, works manager. The new blast furnace will reportedly have the largest hearth diameter and working volume of any furnace in the industry.

Northern Pacific Ry. Co. has agreed to meet the low bid price for coal to be supplied to the Atomic Energy Commission at Hanford Works, Wash.

The move will allow the firm to provide 100,000 tons of coal from its mines at the Roslyn-Cle Elum district of Kittitas County, Wash.

How to keep customers happy— all winter long

Treat all shipments with Sterling Rock Salt, and your customers will be able to unload coal *fast* even in freezing weather. They won't have to thaw your cars or loosen coal by hand. Customers will gladly pay the small premium for coal that is treated so it won't freeze up! You can apply Sterling Rock Salt quickly, too. Just three or four bags of this effective anti-freeze agent will keep an entire carload of coal from freezing! (It takes only 5 lbs. of Sterling Rock Salt to protect one ton of bituminous; 5-8 lbs. for anthracite.)

You can also use Sterling Rock Salt to prevent frozen scales and switches . . . to keep roads and yards clear throughout the winter. It removes snow and ice *fast*. Comes in bulk carloads or packed in 100-lb. bags.

Free folder gives further information on Sterling Rock Salt for mines, collieries. Ask your Sterling representative or write to INTERNATIONAL SALT COMPANY, INC., DEPARTMENT CA-10, SCRANTON, PA.

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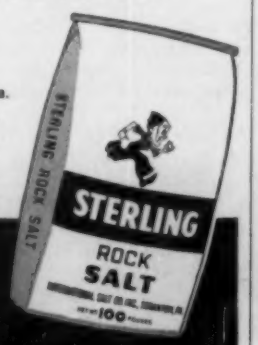

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Our customers helped us design this new unit. We sent our men into the field to find out what our customers needed in a screw conveyor drive—then our engineers designed a new drive that offers the maximum of service, versatility, operating economy and long life. Here are some of its outstanding features:

A COMPLETE DRIVE: Saves engineering and assembly time. Six sizes to cover entire range—each with these ratios: — 4:1, 9:1, 14:1 and 24:1. Bolts to any standard trough end—eliminates trough end bearing. Eliminates drive shaft wobble. Efficient FALK single helical gears.

SEAL HOUSINGS: Choice of seals (neoprene or leather lip, felt or waste) to accommodate material conveyed. Space between trough seal and unit seal prevents conveyed material from reaching unit seal.

REMOVABLE DRIVE SHAFT: Snap ring assembly permits easy removal. Five sizes, from 1½" to 3⅞".

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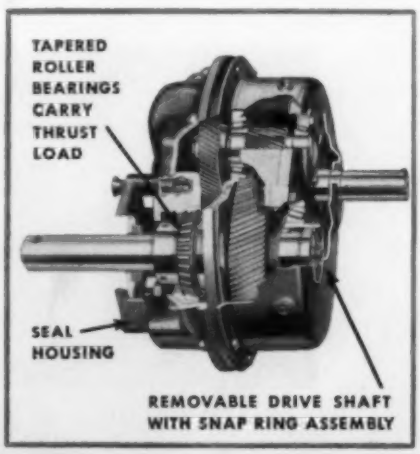
AN IMPORTANT ECONOMY: Buy only what you need—the basic reducer alone, or with trough end and/or motor mount. For detailed information, contact your Falk Representative or Distributor—or ***write direct for Bulletin 7106.***



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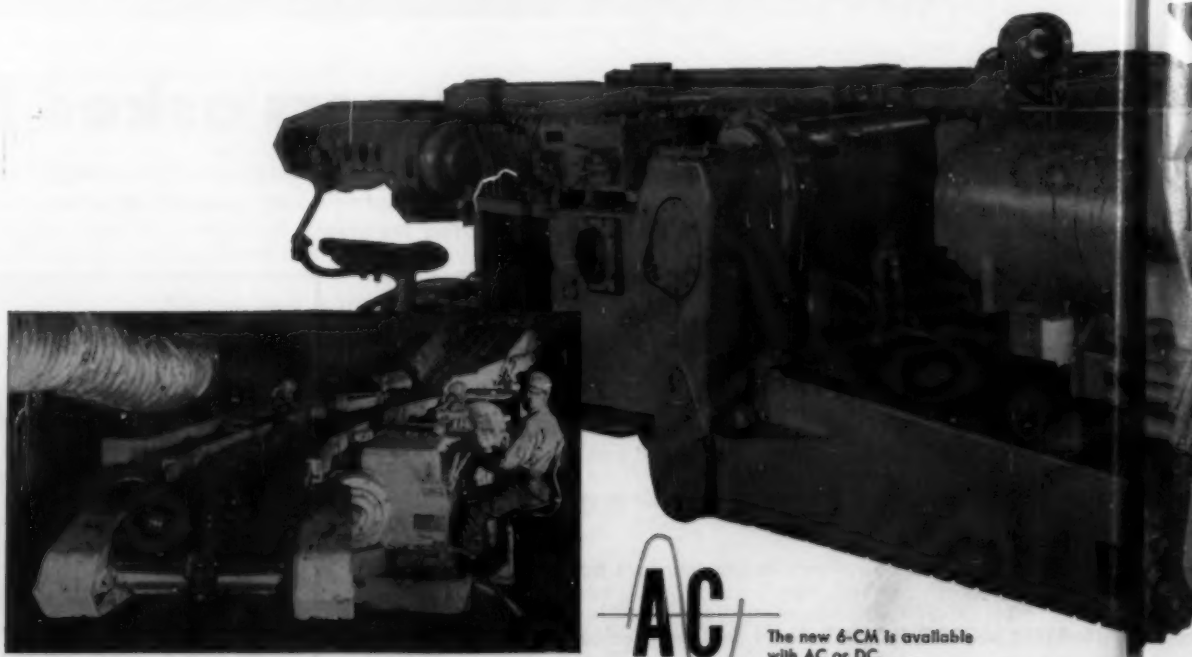

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The new 6-CM is available with AC or DC.

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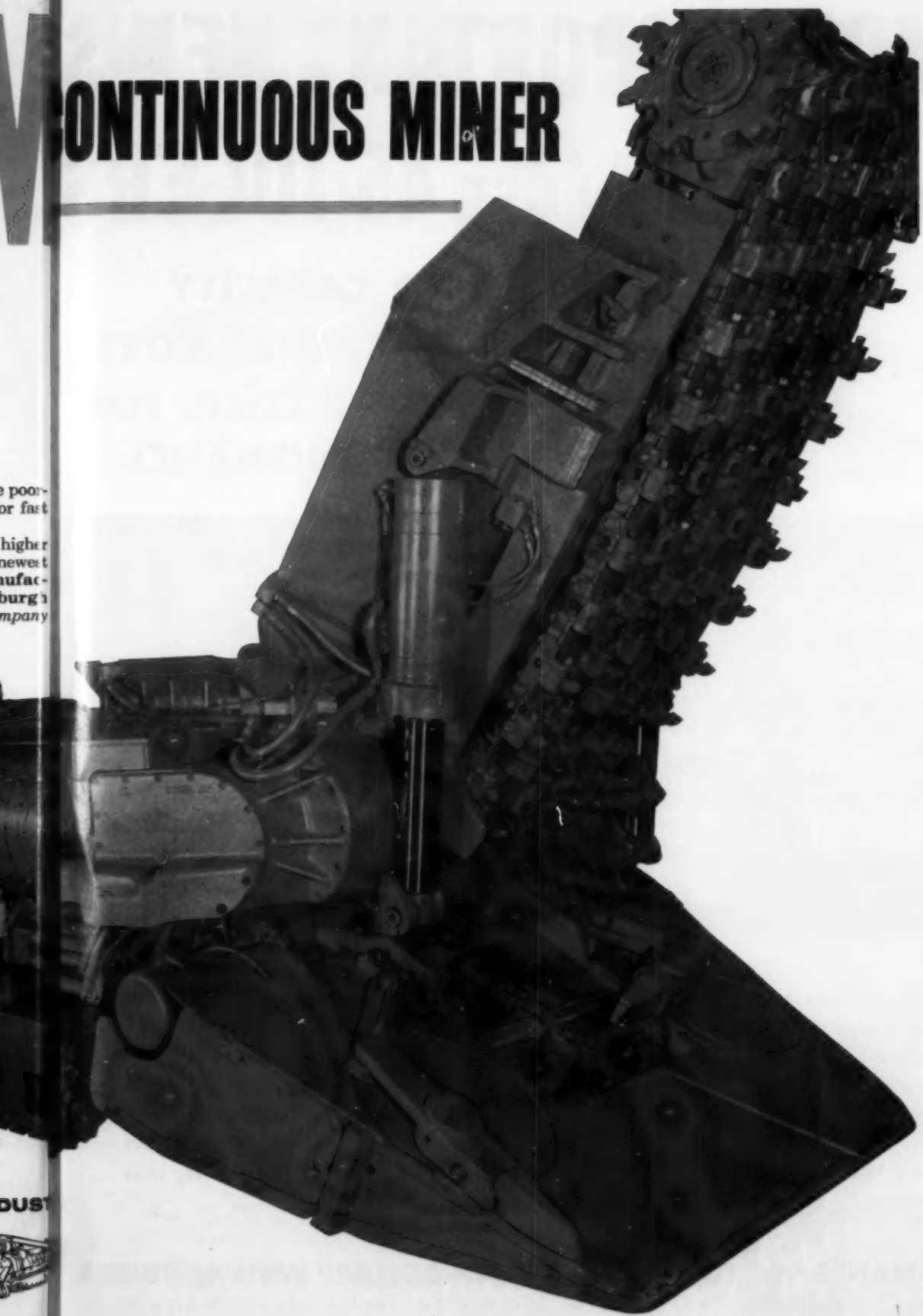

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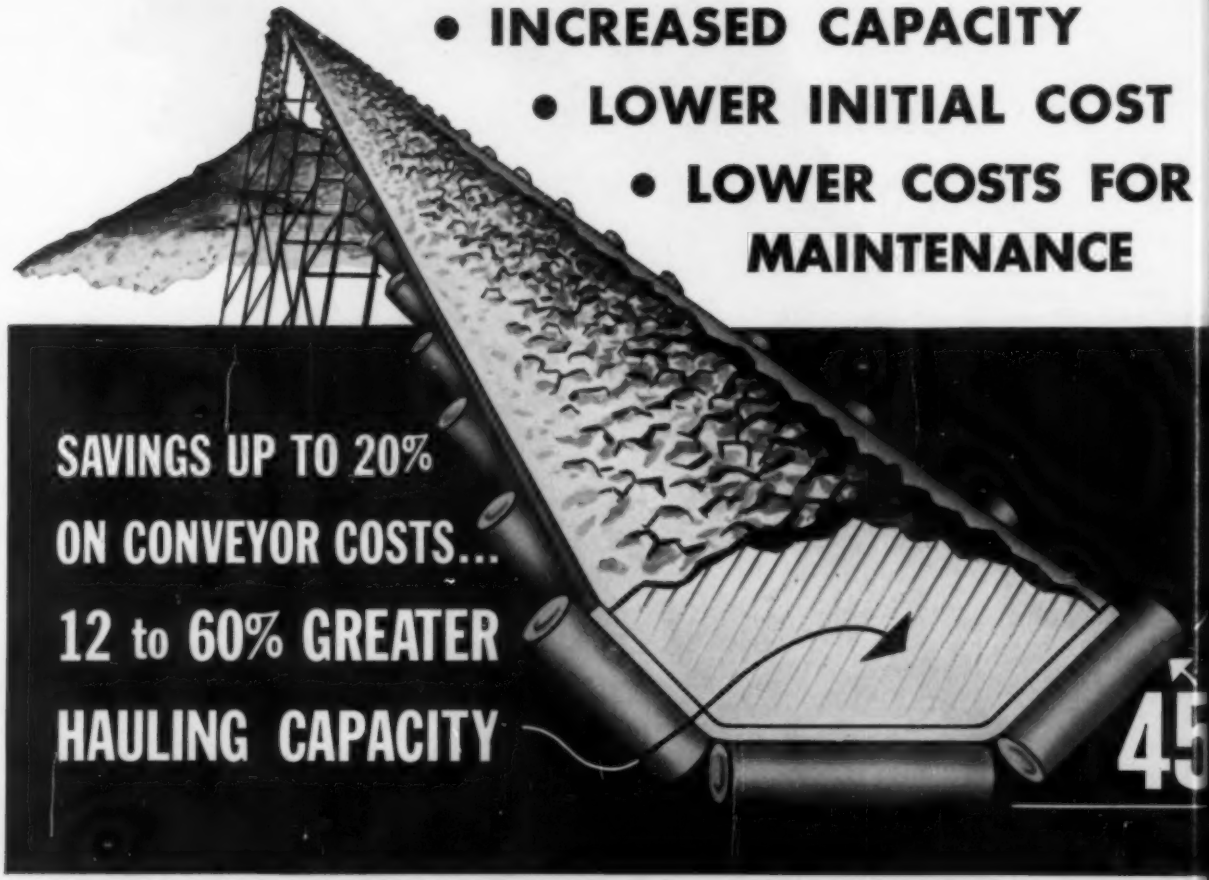

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20° IDLERS REQUIRE WIDER CONVEYOR TO HAUL SAME TONNAGE

Only RAY-MAN CONVEYOR BELT is BUILT to take the EXTRA STRESS OF 45° IDLERS

RAY-MAN IS GUARANTEED NOT TO PLY-SEPARATE AT 45° ANGLES

ORDINARY PLY BELTS ARE TOO BOARDY TO TAKE 45° ANGLES

Ask your R/M representative to show you how Ray-Man Conveyor Belt with 45° idlers can give you the most for your conveyor dollar ... write for new Bulletin M303, "Ray-Man for 45° Idlers."

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are now available in three periods: 5, 9 and 17 MS

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16 mm movie film from which this enlargement was made.

This unretouched photograph was enlarged from a 16 mm frame. It shows a multiple hole blast detonated with Primacord, and hooked up with Primacord MS Connectors in the trunk line. Note the steady progress of this blast from the point of initiation at the left, as indicated by the red line.

Millisecond detonation of Primacord down lines in medium size holes offers many advantages in multiple hole blasting. Millisecond delay relieves burden, results in improved fragmentation. Less explosive may be required than for comparable instantaneous blasting. Decreased vibration and concussion, controlled throw and reduction of bootlegs are other advantages.

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COAL AGE

OCTOBER 1959

IVAN A. GIVEN, EDITOR

Ahead for Bituminous

STANDSTILL YEARS are not a particular novelty in the bituminous industry—nor are recession and depression years, for that matter. Thanks to the steel strike and its effects in other industries, 1959 definitely takes its place in the standstill class. After a good start and a gain of over 6% by vacation time, the industry was set back by steel and finished the third quarter just about on all fours with 1958 in output. The rate for the last quarter probably will average around 9 million tons a week, and consequently the total for the year will come out about even with or slightly ahead of last year, which is one justification for the standstill label.

Since the 1959 standstill rate was approximately one-quarter to one-third under practical industry capacity it has not been simply a matter of marking time until the upward trend resumes. Stresses and strains have been quite evident and scars will be around for some little time. But the bituminous industry will move into 1960 in a state of increased efficiency, with a better product and with a better research and marketing setup. Thus it will be in better position to serve the growing Big Three markets, the prize of which—utilities—is continuing to set new records for coal burn.

In spite of difficulties, from which coal in the U. S. can never expect to be wholly free, its future is assured. Having reached that conclusion one is prompted to compare the U. S. and the rest of the world. Coal still is growing in some parts, particularly in Russia, China and other Asian countries, but in Europe its prospects are not bright. Oil and gas are now moving in and the recent much-publicized troubles in Belgium and the Ruhr are only the beginning for coal in Europe, which is now faced with the competitive onslaught that coal in the U. S. experienced at the end of World War I. The leaner, more-efficient and less-vulnerable U. S. industry, with its big losses behind it and solid prospects ahead can, in contrast, look forward to an expanding opportunity in the immediate and longer-range future as long as it continues to work and invest for lower cost, higher quality and better service.

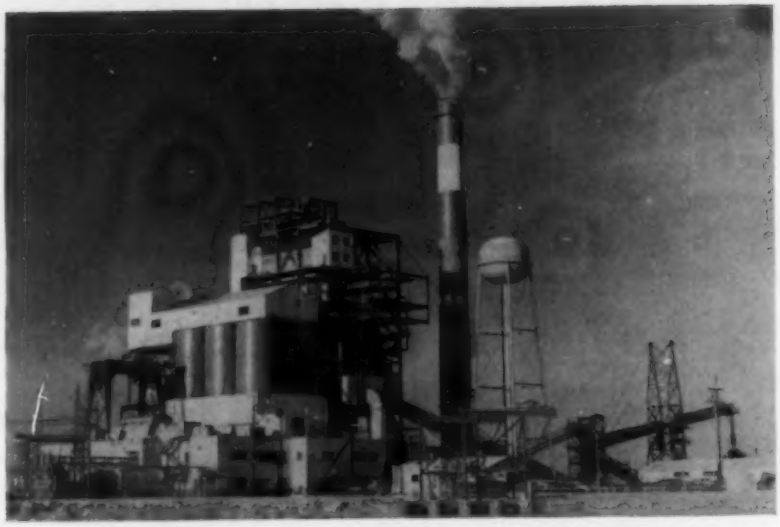
Not Only the Big

"THE BIG OUTFITS can do it but we don't have that kind of money." This has been and still is a fairly common statement in coal when certain steps to improve operations are being considered. Size does count, of course, in many things, but not all – and the exceptions are more numerous than might be seen at first glance. The answer is a little work to uncover the exceptions and cash in on them.

In some instances, as is well known, big items are beyond the smaller operation's reach and small ones are not available. But the big have no monopoly on ingenuity and determination. One doesn't have to be big to have, for example, an efficient maintenance organization. Nor does one have to be big to operate face equipment efficiently, haul coal at low cost, prevent supply loss and waste, ventilate effectively and economically, and so on. For the smaller operation, as well as the big, the payoff reflects study, planning and action—the Big Three in the success of any endeavor.

The first of a proposed group of four 100,000-kw units is feeding electric power into the Northwest Power Pool. Source of energy is a thick seam of Wyoming coal, offering ample reserves for years to come.

Pacific Power & Light Co. builds Dave Johnston plant to provide . . .



DAVE JOHNSTON steam-electric plant now consists of a 100,000-kw turbine-generator unit, with a twin under construction. This present unit increases Wyoming's generating capacity by one third.

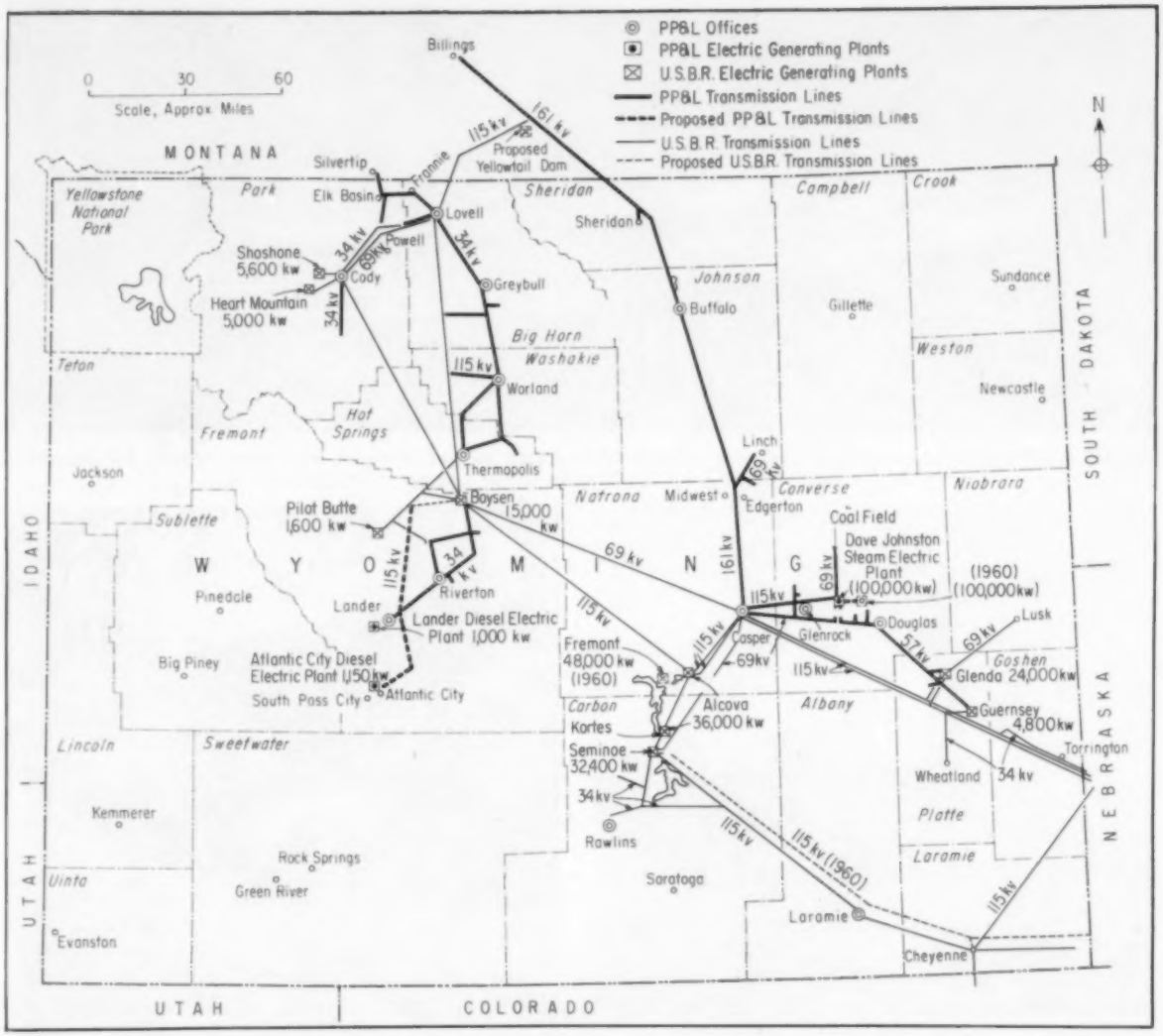
More Coal-Based Power in the West

COAL from this 35-ft subbituminous seam is converted into electrical power and fed into the power grid serving Wyoming. The 8-yd shovel loads 70-ton haulers for 15-mi trip to plant.

THE RECENT OPENING of the Dave Johnston steam plant of the Pacific Power & Light Co. at Glenrock, Wyo., marks the setting of a new and important milepost in the exciting history of the State of Wyoming. The new 100,000-kw power station which will take its fuel from nearby thick seams of sub-bituminous coal, increases the power-generating capabilities within the state by one third. A twin unit now is under construction, and the original plans for the project envision four of these 100,000-kw units. The new plant and development of the associated strip mine represent an investment of $23 million by Pacific Power & Light, including $1 million for construction of a 15-mi haulage road from mine to power plant.

The striking new plant, rising alongside the still-visible pioneer wagon ruts of the Oregon Trail, is a harbinger that the Mountain States are confidently approaching a new era of growth, that adequate electric power will be available to nourish the growth and that there is more power where this came from. Also demonstrated by the project is the fact that lower-rank coals, lying in massive deposits in the Mountain States and particularly in Wyoming, can be economically "shipped by wire" over long distances.

This is a case of a much-talked-about prospect becoming a reality. The Glenrock coal, averaging about 7,000 Btu per lb, is converted into electricity at the mine, then fed into the regional power grid along with power from other investor-owned utilities and U. S. Bureau of Reclamation facilities. A new 250-mi transmission line (161 KV) has been constructed, at an additional invest-



PP&L's new Glenrock facility presages further economic development of Wyoming and the other Mountain States. Adequate power in the West, now and for the future, is a primary company goal. The Glenrock plant will grow as demand increases.

Why Glenrock?

THE CIRCUMSTANCES surrounding the selection of the town of Glenrock as the site for the Dave Johnston steam-electric plant clearly demonstrate the effectiveness of intelligent civic action in averting economic strain on a community. Here is what happened.

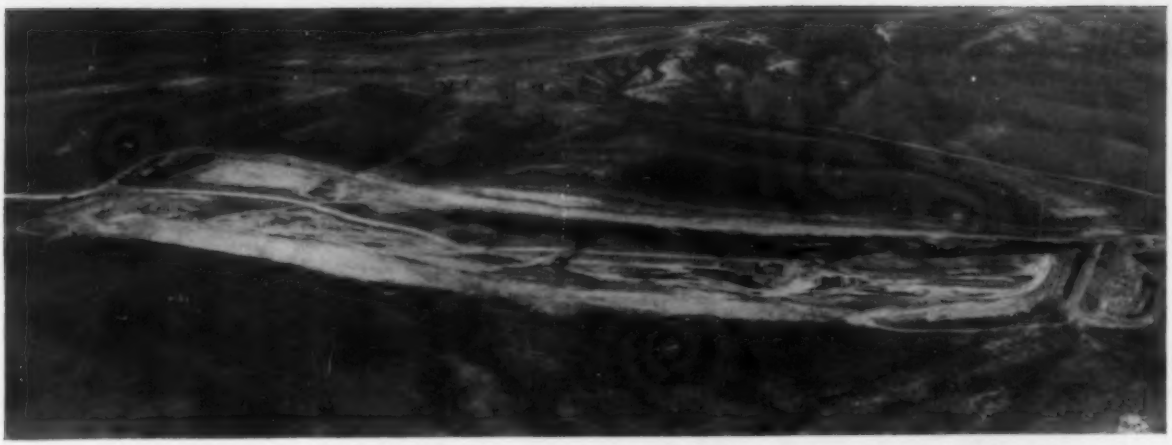
For years the economic center of Glenrock was a large oil refinery. However, by 1955 the refinery had become obsolete and crude oil was delivered to more-efficient modern plants for processing. The citizens of Glenrock were reluctant to see their town deteriorate, so they formed a committee of industry seekers and raised a modest fund to finance the work of the committee. They took stock of their resources. There was ample land and a good supply of water was available in the nearby North Platte River. Good transportation of all types was at hand and their town was relatively close to major industrial centers.

The committee members had heard of Pacific Power & Light's search for a site in Wyoming for a new power plant. They wrote to PP&L headquarters in Portland, Oreg., asking for a meeting in Portland with power company officials. Paul B. McKee, chairman of the board of Pacific Power & Light, replied that the Glenrock committee should preserve its funds, that PP&L officials would come to Glenrock to discuss the town's qualifications as a site for the new plant.

The meeting took place in October, 1955. The question of fuel sources for a thermal plant came up. The Glenrock people pointed out that there were outcroppings of coal in the grazing lands north of town. The coal had not been actively investigated, but from all indications it was there in great quantity.

Accordingly, the power company assigned a geologist to reconnoiter the area. The geologist recommended prospect drilling, and the drilling showed extensive, usable reserves of coal.

Glenrock had itself a new industry. Ground was broken June 30, 1956, and the new plant was dedicated Dec. 20, 1958. Now, instead of watching their town decline, the people of Glenrock are seeing the construction of a new housing development for the additional employees that will be needed at the Dave Johnston plant.



SCRAPER STRIPPING opens original cut to uncover a year's supply of coal. Stripping ratio now is about 1:1; maximum will be 2:1, overburden to coal. Exploratory drilling has proved ample reserves.

COAL DRILL provides 4-in holes on 12-ft centers for breaking seam against a buffer of previously broken coal.

MINIMUM MAINTENANCE TIME is feature of new shovel. Circle-rail and boom fittings are grouped for faster servicing.

LARGE CORRUGATED SECTIONS provide culvert for Sand Creek under haulage road. Fill was placed later.

SINGLE CULVERT SECTIONS make underpasses for county roads along route of haulage road. Wing walls retain fill.

ment of $8 million, from Pacific Power & Light's distribution center at Casper, Wyo., to Billings, Mont., to effect the tie-in with the Northwest Power Pool (see map).

Providing Plant Fuel

It is significant that the Dave Johnston plant is situated on the fringes of the Big Muddy oilfield and that it has available a supply of natural gas. The oil and gas and residual fractions from Caspar refineries are possible alternate fuels, but the nearby coal deposits get the nod as principal source of energy.

Source of the coal for the new plant is a seam 30 to 35 ft thick which outcrops approximately 15 mi north of the plant. Sufficient reserves have been proven to serve four of the 100,000 kw generators for at least 50 yr.

The box cut was opened by the contracting firm, Knisely-Moore, under the overall direction of Ebasco Services, Inc., New York. The cut is 240 ft wide and 1,800 ft long, exposing enough coal for a year's operation. The work was done with tractors and scrapers moving the clayey overburden off the coal and spreading it beyond the outcrop. Some crop coal of inferior quality was left in place. The original contract included only the opening of this cut. Subsequent stripping will be done by Caterpillar D-9's and DW-21's which are now being placed in service by the power company. The D-9's will serve as push-loaders for the DW-21's. Plans for future stripping include the possibility of employing a dragline to lay successive cuts of overburden into the worked-out portions of the pit.

The coal is drilled by a McCarthy-Salem drill and broken with 40% dynamite to prepare it for loading. A row of 3-in holes are drilled on 12-ft centers to a depth of 28 ft in 30-ft coal. Approximately 25 lb of explosive per hole provides the desired breakage. Electric blasting caps are used to detonate the charges and m-s connectors are employed between rows when more than one row is shot. The shooting is done against a buffer of previously broken coal.

The loading shovel is a Bucyrus-Erie 150-B with a 52-ft boom and 30-ft handle. The dipper is an 8 yd Esco coal-loading bucket. Electric power is transmitted to the mine substation over a 69 kv poleline. Utilization voltage at the shovel is 4,160 v, and the seven motors on the unit total 314 hp. Other electrical loads at the mine include lighting, mine shop tools and normal office requirements. There is sufficient capacity in the system to take care of additional electrified mining equipment as it is needed. All mining operations are on a single shift basis.

The haulage fleet consists of four 70-ton KW-Dart coal haulers which make round trips from mine to plant in about 1¼ hr, each hauler making six round trips a day. Approximately 1,680 tpd is moved by the haulers.

W. D. (DAVE) JOHNSTON, for whom the new Pacific Power & Light Co. plant is named, has devoted 37 yr of his career to the electric-power services of the State of Wyoming. He began as an 18-yr-old with the Telluride Power Co., in 1909. A company scholarship took him to Cornell University, where he received his degree in electrical engineering. He saw service in World War I and worked for a short time in the East before returning to Wyoming in 1920.

Mr. Johnston became general superintendent of Natrona Power Co., and later division manager, vice president and director of Mountain States Power Co. More recently he served as vice president of Pacific Power & Light, and, now retired, continues as a director of the company.

The American Red Cross and Boy Scouts of America recognize him as a tireless worker. The Boy Scouts conferred upon him the Silver Beaver Award, the organization's highest honor for a Scouter. Mr. Johnston's hobbies include photography and traveling, fishing and mountaineering.

Haulage Road Design

The 150-B requires from 9 to 11 swings to load one of the haulers to a resulting gross weight, vehicle and payload, of 113½ tons. This is equivalent to a maximum axle load of 50 tons, which makes obvious the need for first-class design and construction of the haulage road. As a matter of fact, the specifications are more like those of a heavy-bomber runway than those of a road because the 50-ton axle load is about five times the allowable load on standard highways. Base courses are about twice the thickness of those used on state highways.

Construction of the road required the removal of 750,000 cu yd in cut sections and the placing of 550,000 cu yd of fill. The first half of the road, proceeding from plant to mine, passes through a sandy area containing active sand dunes. The other half passes almost entirely through shales and clays. A natural division of these two areas is formed by Sand Creek, which drains an area of 470 sq mi.

Base courses have been laid to a total thickness of 20 in. The lower base course is 14 in thick and the upper is 6 in thick. Both base courses and all fills are compacted to a specified degree that far surpasses bearing ratios and compaction values in conventional highway construction for interstate roads.

In cut sections in the clay areas, depending upon the material encountered, up to 14 in of imported sub base material was placed and compacted to meet the specifications for fill in the sand section of the road. Extensive preliminary surveys of the soils along the right-of-way were conducted because it was desirable to make all possible use of available native materials. The sand throughout the first section of the road provided excellent material for the sub-base. Gravel deposits along the right-of-way could be used as sources of base-course material with a minimum amount of processing.

In the clay-and-shale section of the road a seal of cut-back asphalt was placed on the top surface of suitable shales to prevent deterioration upon exposure to air and to decrease the amount of imported material that would otherwise be needed to effect a seal. One of the major difficulties

PASSING TURNOUTS contribute to construction economy and haulage safety. Operators are in contact with each other by two-way radio and turnouts are numbered.

COAL-HANDLING EQUIPMENT is designed to serve the needs of two 100,000-kw units. Note telescoping spout which confines dust in lowering minus ¾-in coal to ready pile.

PP&L OFFICIALS inspecting plant site are Paul B. McKee (left), board chairman; D. R. McClung, president; E. Robert deLuccia, vice president and chief engineer, and Veryl Hoover, general manager, Wyoming operations.

was a lack of water for construction purposes. This was solved by hauling water from the North Platte River in tank trucks and pumping it into storage reservoirs built by the contractor along the right-of-way.

Culverts and Underpasses

Another important consideration was the design and construction of culverts, essentially for drainage but doubling as cattle passes since the road passes through some excellent grazing lands. In shallow fill the impact of the coal haulers was the governing factor in design, but in other areas the stresses imposed by construction activities governed. All things considered, it was decided corrugated metal culvert sections would best provide the flexibility, strength and safety margins that were required.

The crossing at Sand Creek required making provisions for passing a possible flash flood of 20,000 ft per sec through a 28-ft fill. A battery of three 17-ft 3-in by 16-ft Armco MultiPlate underpasses used as hydraulic structures solved the problem. The upstream face of the fill was riprapped, and 8-ft sections of Armco interlocking sheeting were driven along the upstream toe of the three pipes as additional protection against erosion.

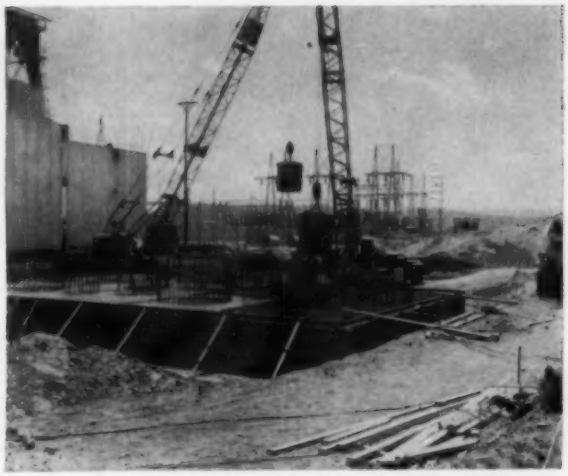
County road crossings were constructed of Armco underpasses of similar dimensions, according to the designs of the Wyoming State Highway Dept., and the Interstate Highway Program. Armco bin-type retaining walls were installed to confine the fill at approaches to these underpasses. Ebasco Services designed the road and culverts and supervised construction. The contractor was Knisely-Moore Construction Co., Douglas, Wyo.

An outstanding feature of the road is its average grade of 2% in favor of the loaded carriers of coal to the plant. This means that a conversion to track haulage can be made with minimum new construction, when and if the haulage economics dictate such a change.

The completed road is a single-lane thoroughfare for the 14-ft-wide Dart haulers. These huge vehicles straddle the crown when traveling loaded to equalize the burden on the tires. Some provision had to be made for safe passing of the loaded and empty haulers. This was accomplished by constructing passing turnouts into which an empty hauler could be driven to permit a loaded one to pass with full right of way. The turnouts, located at strategic intervals along the 15-mi route, did not require the thick base courses which support the main haulway.

Drivers of the four haulers are in constant two-way-radio communication with each other. In this way, the driver of an empty hauler on a return trip to the pit knows which turnout to enter to clear the road for an oncoming loaded hauler.

PLANNING FUEL SUPPLY are Tony Taucher (left), mine superintendent; A. E. Newcomb, general superintendent, and Fred King, PP&L engineer.



CONCRETE FOOTINGS for the coal pulverizers of the second 100,000-kw unit are poured alongside recently completed plant. Two more units may be added later.

Efficient Coal-handling

The coalhandling system was designed by engineers of Ebasco Services and McNally-Pittsburg Mfg. Corp. to stock, crush and reclaim the fuel at a maximum rate of 560 tph. The storage area includes space for "permanent" pile of 112,000 tons and a "ready" pile of about 20,000 tons. In addition to this storage capacity, six silo-type plant bunkers provide volume for a 24-hr supply of coal, or 2,400 tons.

Coal-handling sequence at the plant is as follows:

The 70-ton coal bottom-dump haulers discharge into an under ground hopper from where the coal is fed onto a belt conveyor which elevates the material to a McNally-Pittsburg rotary breaker. The rotary breaker reduces the run-of-the-mine to minus 4 in, and this product is elevated on a secondary belt conveyor to a transfer tower. A secondary crusher is installed in the transfer tower to reduce the minus 4-in coal to minus ¾ in.

From the crusher hopper in the transfer tower, the minus ¾-in coal can be directed either to the plant bunkers or to the ready pile which is built up over a reclaiming hopper. A reclaiming conveyor leads from this hopper to the transfer tower and onto the plant feed conveyor.

The permanent storage pile is built up by bulldozers which take their supply from the ready pile. One of the unusual features of the storage equipment is a telescoping tube which conducts coal from the discharge end of the stacking conveyor down to the ready pile. This method of confining the coal prevents it from being blown about by the winds. The tube is retracted within itself as the pile builds up.

A Traxcavator with a curved blade is available at the dump hopper to make certain there is no pile of coal on the hopper to delay dumping following trucks. In one pass across the Traxcavator removes peaks by pushing them along the grizzly to corners of the hopper where there is room for the coal. The bunkers are filled by a traveling belt tripper which moves along the tops of the six bunkers in distributing the coal. The coal is drawn from the silo bunkers directly into the pulverizers for final grinding prior to firing in the boiler.

Each of the six pulverizers handles 31,000 lb per hr, reducing the minus ¾-in coal to dust. The dust is then carried in a preheated charge of air into the combustion zone in the boiler. The six primary air fans supply 32,000 cfm.

Pacific Power & Light Co. Officials and Managers

Paul B. McKee, Chairman of the Board
D. R. McClung, President
E. Robert deLuccia, Vice President and Chief Engineer
Veryl Hoover, General Manager Wyoming Operations, PP&L
A. E. Newcomb, Superintendent Dave Johnston Plant
Tony Taucher, Mine Superintendent

Wells Supply Water

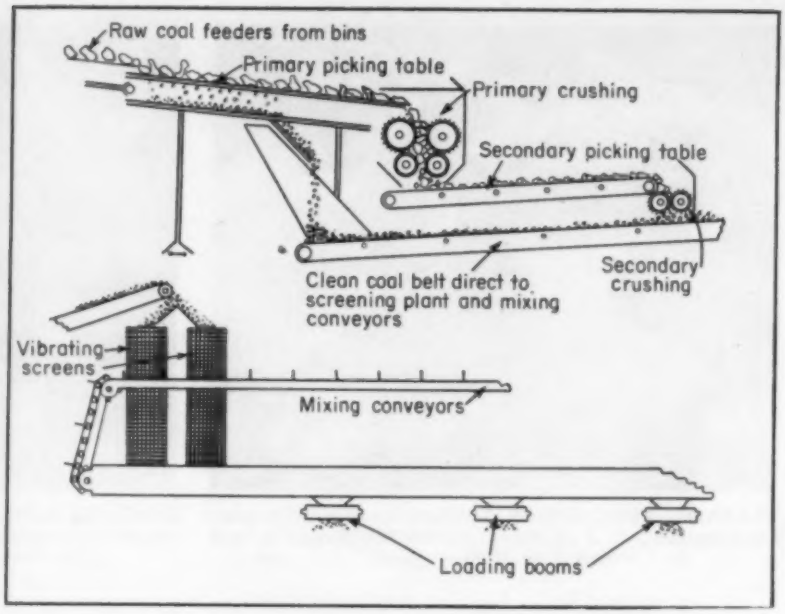
The supply of boiler water is taken from four deep wells and stored in a 100,000-gal elevated tank. It is chemically treated to prevent scale from forming in the tubes. Cooling water for the Ingersoll-Rand condenser is taken from the Platte River.

The condensate storage tank holds 90,000 gal.

The structure of the Babcock & Wilcox boiler is 170 ft high. The boiler itself is suspended from overhead steel members to accommodate the expansion that takes place when the boiler is operating. Boiler output is 750,000 lb per hr of steam at 1,005 F and 1,550 psig.

The turbine-generator is a General Electric 100,000-kw unit. The stator weighs 188 tons, the heaviest single piece of equipment involved in the erection of the plant. The turbine is a two-stage unit, receiving steam initially at 1,450 psig and 1,000 F and returning this steam to the boiler from the first stage at 750 F for reheating to 1,000 F at lower pressure. The reheated steam then passes through the final stage of the turbine and into the condenser. The hydrogen-cooled generator operates at 3,600 rpm and produces electricity at 13,800 V. Transformers in the adjacent yard step this up to 115,000 V for transmission to the Caspar distribution center.

1. **FIELD SAMPLING** before loading fixes quality; permits initial blending.



2. **AT THE TIPPLE,** double picking and crushing refines field blend; removes impurities. Double-screening produces wide range of coals from ¼ to 5 in.

3. **AT CAR LOADING,** samples are taken daily for lab analysis . . .

Raw Coal Quality Control Pays Off for M & O

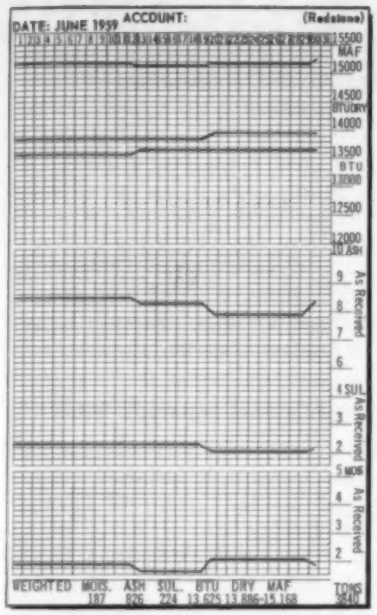
With a minimum investment in processing equipment, Clarksburg, W. Va.-based independent builds competitive strength by selling coals comparable to big preparation plant quality at 40c less per ton.

By **W. A. Raleigh Jr.**
Associate Editor, Coal Age

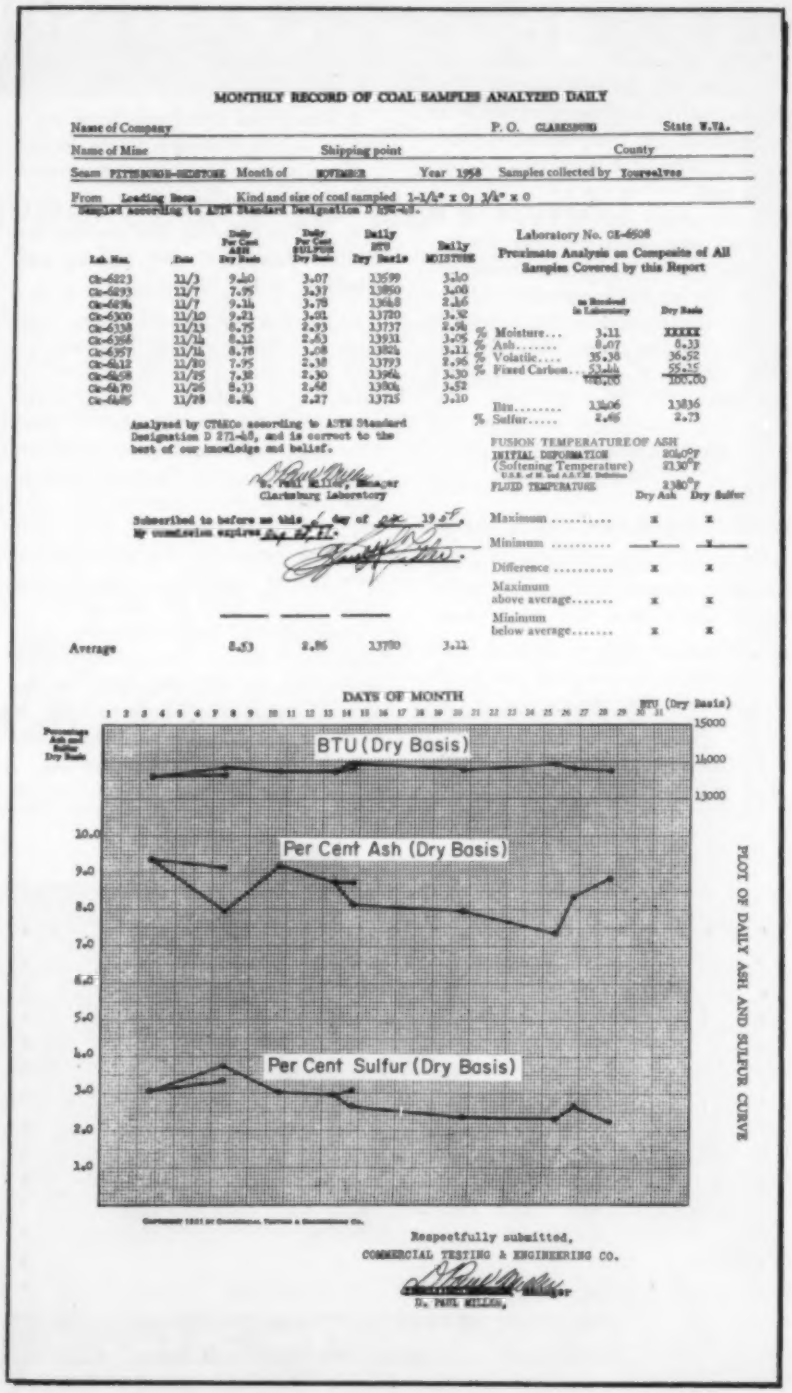
A MERCHANDISING PLAN based on mine-to-market control of raw-coal quality is the M & O Coal Co.'s answer to competing effectively with top-ranking producers whose multi-million dollar preparation plants also process and sell steam coals from the Clarksburg-Fairmont field, Dist. 3, northern West Virginia.

Maximum raw-coal quality control is achieved through an integrated plan which combines selective mining from high-grade coal properties, field sampling and blending, double-picking and crushing at the tipple, and an analytical program of daily testing of car loadings by the Commercial Testing & Engineering Co., Clarksburg, W. Va.

In the Clarksburg-Fairmont field, M & O, with headquarters at Clarksburg, W. Va., is exclusive sales agent for five companies mining the Pittsburgh and Redstone seams and having a combined annual production capacity of 2,000,000 tons of strip and deep coal. The companies, all served by the Baltimore & Ohio Ry., are Bitner Fuel Co., C & C Coal Co. (deep), Grafton Coal Co.,



4. RESULT is quality record for customer (above) and management.



MONTHLY RECORD OF COAL SAMPLES ANALYZED DAILY

Name of Company P. O. CLARKSBURG State W.VA.

Name of Mine Shipping point County

Seam PITTSBURGH-REDSTONE Month of NOVEMBER Year 1958 Samples collected by Yourselves

From Loading Boom Kind and size of coal sampled 1-1/2" x 0; 3/4" x 0

Sampled according to ASTM Standard Designation D 2234-48.

Lab. No.	Date	Daily Per Cent ASH Dry Basis	Daily Per Cent SULPHUR Dry Basis	Daily BTU Dry Basis	Daily MOISTURE
Cs-6823	11/3	9.40	3.07	13599	3.50
Cs-6893	11/7	7.95	3.37	13850	3.08
Cs-6836	11/7	9.14	3.78	13648	2.16
Cs-6300	11/10	9.21	3.01	13720	3.32
Cs-6338	11/13	8.75	2.93	13737	2.94
Cs-6366	11/14	8.12	2.83	13931	3.05
Cs-6357	11/14	8.78	3.08	13824	3.11
Cs-6412	11/20	7.95	2.38	13793	2.96
Cs-6458	11/25	7.38	2.30	13964	3.30
Cs-6470	11/26	8.13	2.68	13804	3.52
Cs-6485	11/28	8.84	2.27	13715	3.10
Average		8.53	2.86	13780	3.12

Analyzed by CT&ECo according to ASTM Standard Designation D 271-48, and is correct to the best of our knowledge and belief.

H. Paul Miller, Manager
Clarksburg Laboratory

Subscribed to before me this 4 day of Dec. 1958.
My commission expires Aug. 27, 19[illegible].

Laboratory No. CS-6508

Proximate Analysis on Composite of All Samples Covered by this Report

	As Received in Laboratory	Dry Basis
% Moisture	3.11	XXXXX
% Ash	8.07	8.33
% Volatile	35.38	36.52
% Fixed Carbon	53.44	55.15
	100.00	100.00
Btu	13606	13836
% Sulfur	2.68	2.73

FUSION TEMPERATURE OF ASH

INITIAL DEFORMATION 2040°F
(Softening Temperature) 2130°F
U.S.B. of M. and A.S.T.M. Definition
FLUID TEMPERATURE 2380°F

	Dry Ash	Dry Sulfur
Maximum	x	x
Minimum	x	x
Difference	x	x
Maximum above average	x	x
Minimum below average	x	x

DAYS OF MONTH

BTU (Dry Basis)

Percentage Ash and Sulfur Dry Basis

BTU (Dry Basis)

Per Cent Ash (Dry Basis)

Per Cent Sulfur (Dry Basis)

PLOT OF DAILY ASH AND SULFUR CURVE

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
By H. PAUL MILLER, Manager

Knight Coal Co. (deep) and United Coals, Inc.

Double-screened coals are produced from ¾ to 5 in, including all intermediate sizes. All sizes can be modified with any percentage of fines. Output—based on total production, supervisory and office personnel—averages at least 20 tpd.

To M & O, meeting competition effectively means cementing ties with its existing trade and building strength for product acceptance by new customers. Robert D. Cowen, president, and Donald D. Saxton, executive vice president and treasurer, figure their firm is doing both of these jobs by offering coals comparable to big-preparation-plant quality at 40c less per ton.

From its Dist. 3 mines and through its offices in Cleveland, Clarksburg, Philadelphia, and New York City, M & O this year expects to sell 1,500,000 tons of steam coals to Eastern Seaboard, Canadian and Great Lakes markets. (The firm also sells coal produced from mines located in Kentucky, Pennsylvania, Virginia and Ohio.)

Basic Sales Approach

Necessity, as the old adage would have it, mothered invention of M & O's basic sales approach. In recent years, the accelerated trend toward coal-company mergers and toward big, publicly-owned stock companies has put the squeeze on the smaller, privately-owned independents. Stock companies with good records have relatively easy access to large amounts of capital for expensive quality-control preparation equipment.

"To beat increasing competitive pressures from the big guys we had to come up with a different sales approach or face going out of business," Don Saxton explains.

Defining the approach, he adds:

"We first sell customers and prospects on the general values of coals in the Clarksburg-Fairmont field also mined by big-name producers.

"We also stress that we are not a 'fly-by-night' operation. Our present

properties contain a reserves supply which will enable us to meet customers' demands for at least 10 yr.

"After selling the field and our reserves position in the field, we then sell the particular values of M & O coals which are comparable, consistent in quality and considerably lower in cost.

"F.o.b. mine prices for M & O products run about 60c less per ton than list prices for similar coals produced by bigger companies. Allowing for slightly lower BTU quality, usually ranging from 200 to 300 BTU, we figure, on the basis of 7c per 100 BTU, that we offer customers a net price advantage of about 40 to 45c per ton."

Controlling Raw-Coal Quality

M & O's integrated plan of mine-to-market control of raw-coal quality breaks down into five main steps:

1. Purchase high-grade coal lands and maintain continuous search for equivalent-quality properties to replace worked-out tonnage.

2. Develop strip properties to the economic limit followed by deep-mining—sampling each section within an area to determine exact quality, and permit mapping of the area as to ash and sulphur content.

3. Load coal selectively from each section within a sampled area to get a blend which approximates quality called for in a contract.

4. Refine blending and remove impurities through double picking and crushing at the tipple.

5. Have a commercial testing laboratory provide a daily analysis for each mine from a sample obtained by collecting a minimum of three increments per car from the falling flow of coal during a loading period. Commercial Testing & Engineering Co. acts in an advisory capacity in working with our technical staff and provides personnel for periodic inspections of sampling to see that it conforms to A.S.T.M. standards.

Field-control techniques for strip and deep mines are similar except deep coal is stored in bins at the mine mouth so that it can be as conveniently available for field blending as the strip-mined product.

Equipment used at the tipple is the minimum essential to follow the quality-control plan. Included are two picking tables, two crushers, vibrating screens and mixing conveyors. Arrangement of the equipment allows for raw coal to be picked and recombined twice (see diagram).

Worth noting is this special feature of the tipple operation. If a bad truckload shows up, it can be diverted to a substandard car. This way the poor quality coal does not contaminate good coal, as frequently happens in larger operations.

Professional Analysis Vital

Key step in M & O's merchandising plan is the daily analytical program conducted by Commercial Testing & Engineering Co. according to A.S.T.M. Standard Designation D 492-48 (See chart). The analyses and charts are certified. This step provides a sales and quality-control tool believed uncommon in coal mining operations.

M & O's analytical program was started because the firm wanted to have a running record of the quality of coal shipped to customers from each of its mines. Mine-control records have been followed with records for individual customer accounts. These are prepared on customer request or when salesmen consider them necessary to service an account. With these records, the Clarksburg office has a running quality record of what has been shipped to each customer—chemical analysis and weight being used to determine weighted average.

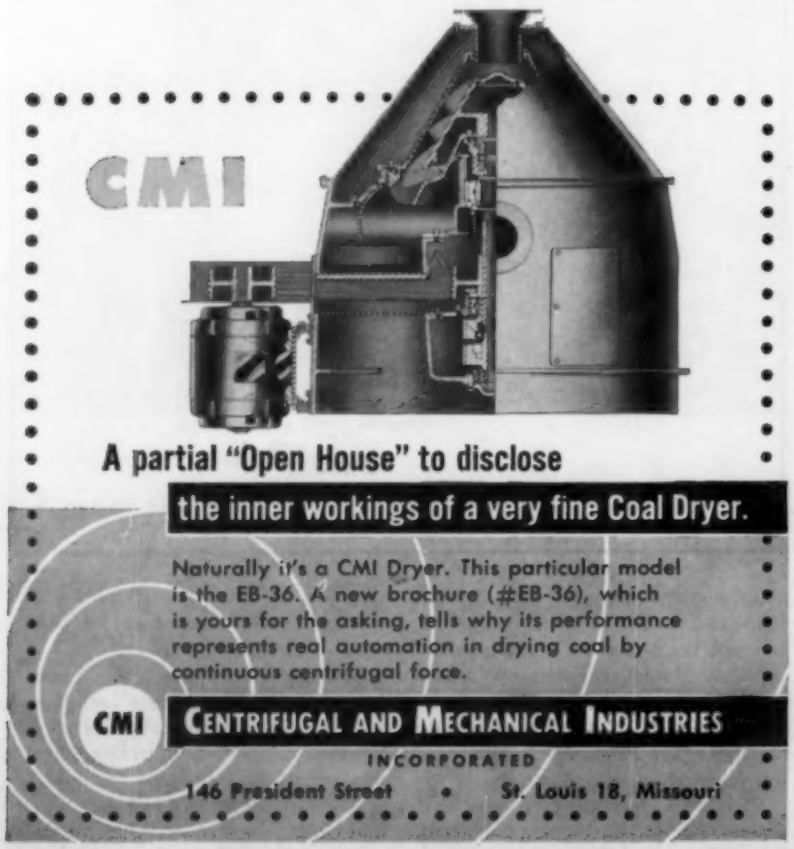
"Some firms may shy away from such extensive professional laboratory and field service because of cost," says Don Saxton. "Our feeling and experience, however, is that this type service is more than justified by the following advantages:

"1. It puts our operation on a solid foundation for competing with bigger companies in terms of facilities to insure consistent-quality products at attractive prices.

"2. It stabilizes our trade with existing customers.

"3. It provides a powerful stepping stone to new customers.

"4. Mine management, by watching the analytical charts, has a barometer that continuously keeps them informed of how well they have done their job."


CMI
A partial "Open House" to disclose
the inner workings of a very fine Coal Dryer.
Naturally it's a CMI Dryer. This particular model is the EB-36. A new brochure (#EB-36), which is yours for the asking, tells why its performance represents real automation in drying coal by continuous centrifugal force.
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146 President Street • St. Louis 18, Missouri

In close quarters . . .

O-B SHELLS AND PLUGS

they've proved easier to work with!

Where space—and time—is at a premium, the requirement is an expansion unit that "goes up easy and stays put!" Here flexibility is critically important—the ability to compensate for and overcome slight variations in the size and shape of the bolt hole. Here fast-setting expansion is a must—the ability to expand fast and hold fast in soft friable shale as well as hard rock. Here four-way expansion, low unit stresses, maximum *effective* use of the anchor's strength mean faster, safer, more efficient bolting—and here more and more operators are now specifying O-B expansion shells and plugs!

OHIO BRASS COMPANY • MANSFIELD, OHIO
Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

Ohio Brass

EXPANSION SHELLS AND PLUGS • LINE MATERIALS • SAFETY AND CONTROL EQUIPMENT • ELECTRIC HAULAGE MATERIALS

HOLAN

4941-M

USS "T-1" Steel dipper weighs 5 tons less, scoops 10% more load. This shovel originally had a 30-cu.-yd. dipper (90,000 pounds capacity) that weighed 57,650 pounds. It was replaced with a 33-cu.-yd. (99,000 pounds capacity) dipper made of USS "T-1" Constructional Alloy Steel that weighs only 46,900 pounds—a clear saving of 10,750 pounds of steel. The new dipper has a capacity gain of 10%, or 9,000 pounds; yet its total weight, including load, is nearly one ton less than the old unit. "T-1" Steel is a natural for dipper and bucket construction. It has tremendous yield strength (100,000 psi min.), weldability and exceptional resistance to impact abrasion. This dipper was built by Bucyrus-Erie for use in the Red Ember Mine of the Truax-Traer Coal Co. near Fiatt, Illinois. Mr. Roy Leseney, Mechanical Superintendent of the mine, says that "T-1" Steel dippers are doing a marvelous job for them. They dig better, handle easier and last much longer than dippers previously used.

Stainless Steel? You can hardly wear it out! That's what John Robinson, Chief Foreman at the Truax-Traer Burning Star Mine says about the USS Stainless Steel used in vibrator screens, liners and chutes. The old iron screens wore out in 6 months but these stainless vibrator screens have been in for 30 months with little signs of wear. Another big advantage is that fine, wet coal doesn't stick on stainless steel. No cleaning at all has been necessary—an obvious saving in time, labor and money.

How Truax-Traer reduces mining costs with USS Special Steels

One sure way to reduce mining costs is to use stronger, brawnier steels that can take pounding, rough handling, and constant abuse. At Truax-Traer mines, USS High-Strength Steels, extra strong "T-1" Constructional Alloy Steel and Stainless Steel are very much in evidence. These special steels are boosting service life, increasing payloads, reducing downtime and saving operating dollars.

Here are the USS Steels that do more —and save more:

USS MAN-TEN Steel—High strength with abrasion resistance and economy. (Minimum yield point 50,000 psi)

USS COR-TEN Steel—High strength with superior atmospheric corrosion resistance and abrasion resistance. (Minimum yield point 50,000 psi)

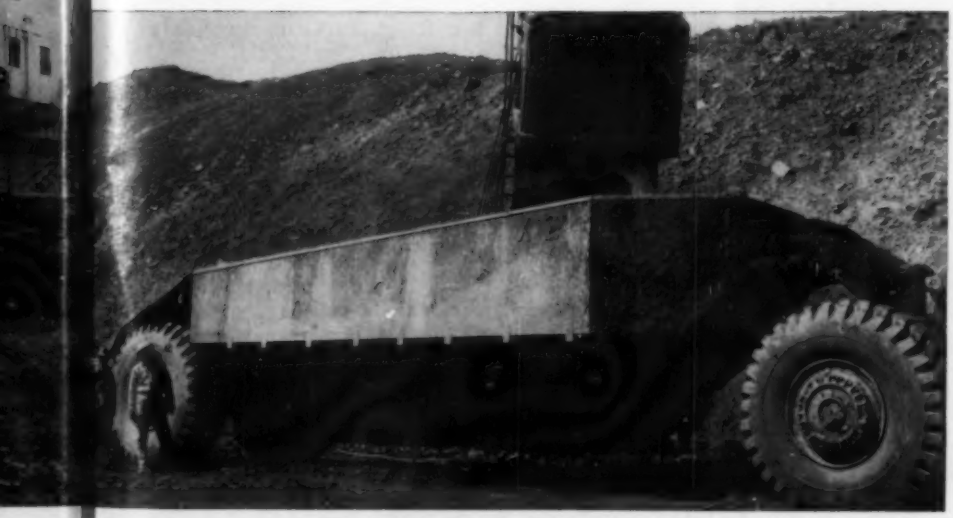
USS TRI-TEN Steel—High strength with toughness, weldability and abrasion resistance. (Minimum yield point 50,000 psi)

USS "T-1" Steel—Super strength with impact abrasion resistance, weldability and toughness. (Minimum yield strength 100,000 psi)

USS STAINLESS Steel—High resistance to corrosion, elevated temperature and abrasion.

Each of these USS Steels is superior for certain applications. Our metallurgists will help you choose the best steel for your job. Contact our nearest sales office or United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, COR-TEN, MAN-TEN, TRI-TEN, and "T-1" are registered trademarks



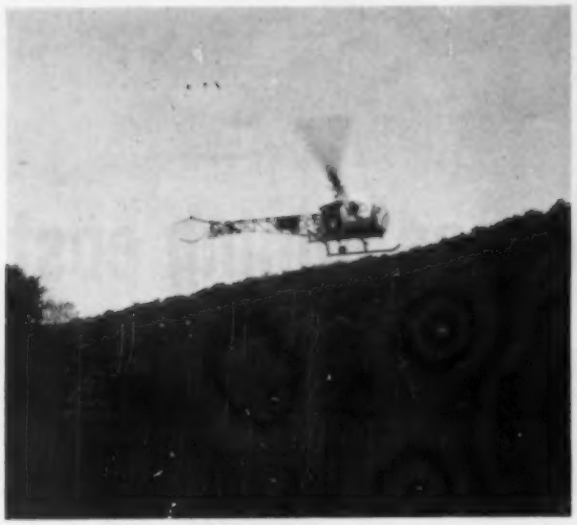
60-ton high-strength steel trailer replaces three 20-ton units. Four of these giant Euclid trailers haul coal between the stripping operations and the tipple at Truax-Traer's Burning Star Mine #1 near Elkville, Illinois. Each one does as much work as three of the 20-ton units previously used—with a big saving in operating costs.

To get maximum capacity with low weight and low maintenance, the designers used two USS High-Strength Steels, COR-TEN and MAN-TEN brands. These steels have great ability to take shock, abrasion and wear and COR-TEN steel offers 4 to 6 times the atmospheric corrosion resistance of carbon steel. The trailers have been in use 6 months and no maintenance has been necessary.

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

USS



COMPANY HELICOPTER enables mining officials to visit 14 different centers of activity in 2 hr 45 min.

READY for takeoff from Shawville heliport are James Hudson (left), general superintendent, and Richard T. Birk, pilot.

Helicopter Saves Executives' Time,

Coal industry's first helicopter pays off in central Pennsylvania hills. Officials now visit in 2¾ hr 14 far flung activities formerly requiring 14 hr of driving.

A NEW sight in the sky over the Clearfield, Pa., area is the coal industry's first executive helicopter. Owned by the Shawville Coal Co. and serving three other affiliated mining, construction and equipment companies, the three-passenger Bell 47G2 helicopter makes it possible for executives to visit 14 different centers of activity in 2 hr 45 min. Before the helicopter was bought, Benson Lingle, president of Shawville Coal, and James Hudson, general superintendent, frequently spent 14 hr driving to the far-flung operations scattered over 300 sq mi.

Every morning at 7:15 the helicopter's rotor is turning at the company's Shawville heliport and Richard T. Birk, pilot, is ready to take off with his first passenger. In an average day the helicopter flies about 2 hr and sometimes flies as much as 6 hr or as little as ½ hr. Within 3 min of the time the helicopter leaves the Shawville heliport supervisors can be at any of the operations. While enroute to a specific operation the superintendent can see strip pit conditions from the air and talk to the operator of the stripping unit over the Motorola radio network and give him any necessary instructions. The many enterprises are scattered throughout Bradford, Covington, Goshen and Laurence townships as well as in the town of Clearfield.

Versatility is noted as the outstanding feature of the helicopter. It can go forward, backward, sideways, up or down and can hover in mid-air. It can fly at 100 mph

SHAWVILLE COAL CO.

HELICOPTER FLIGHT REPORT

Date May 5, 1959

FROM	TO	Time Out	Time Down	Time In Flight	REMARKS
Office	BX	0720	0724	04	Jim
BX	BX	0731	0739	08	" - Tobe
BX	Odessa	0743	0749	06	Jim
ODE	#144	0801	0809	07	"
#144	HIG	0821	0830	09	"
HIG	CAR	0844	0848	04	"
CAR	LIT	0856	0859	03	"
LIT	CUR	0922	0927	05	"
CUR	PRL	1012	1024	12	"
PRL	L1	1036	1041	05	"
L1	Office	1050	1055	05	"
Office	BX	1236	1240	04	"
BX	ZS	1250	1255	05	"
ZS	ODE	1301	1303	02	"
ODE#	#9	1314	1317	03	"
#9	Lingleville	1322	1329	07	"
Lingleville	L1	1333	1342	09	"
L1	PRL	1350	1353	03	"
PRL	LIT	1418	1423	05	"
LIT	L1	1504	1510	06	"
L1	Office	1518	1521	03	"
Office	BX	1532	1538	06	" (Parts)
BX	Office	1545	1548	03	"
	Total			2:04	

TYPICAL daily log of helicopter flight time shows 23 stops and 2 hr 4 min flight time.

DEEP MINE is reached quickly by making direct beeline flight over Pennsylvania hills to portal.

STRIP MINE is inspected from air. Superintendent talks to dragline operator by radio, lands only if problems arise.

Results in Better Supervision

but its best cruising speed is 85 mph. It can soar to 14,000 ft or skim over the hill tops.

During the past winter the helicopter made its rounds when weather conditions brought cars and jeeps to a standstill. Fog which settles in the valleys during the night is the worst problem faced in flying the helicopter. Although fog causes some delay in the early morning takeoffs, the time saved in flying to the operations soon makes up for any delay.

During February and March, when strong winds and turbulent air move over the Pennsylvania mountains, flying becomes difficult at times. But again the advantages of the helicopter far outweigh the disadvantages.

If the helicopter has a good, clear approach, only a 10x10-ft bearing area is needed for it to rest on. To clear the rotor blade requires a 50-ft-diameter circle.

In addition to providing fast transportation of company executives and operating supervisors, the helicopter proves itself extremely valuable when purchases or leases of coal lands are being considered. For example, the company's leasing agent and stripping superintendents can fly over a property in a few minutes and spot the best location for drill holes, and roads, estimate spoil areas and locate the best point to open a new pit. Management says that by flying over a piece of property for these few minutes it gets information that would require several days on foot.

The Lingle interests maintain two licensed heliports, one in Shawville at Shawville Coal's headquarters and the other in Clearfield at the B & R Equipment & Supply Co.'s plant.

Complete mechanical care of the plane is contracted to Helicopter Patrol, Inc., Clarksburg, W. Va. On completion of 100 hr of flying time, the helicopter undergoes a thorough inspection, adjustment and any necessary repairs. When the plane logs 600 hr of flying time it will undergo a major overhaul.

INSPECTION of tree growth on leveled and reforested spoil areas is simplified. Company is booster of reforestation.

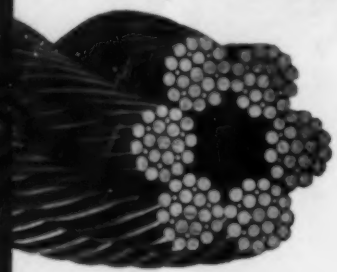
Shawville officials note that the company gets all of the advantages of flexibility in helicopter flying and access to all company operations in a matter of minutes for an investment approximately the same as needed for a two-engine 4-passenger plane. Furthermore, the company could not use a conventional airplane. The helicopter can stay aloft for 2 hr and 30 min. Its engine burns 80-octane aviation gasoline.

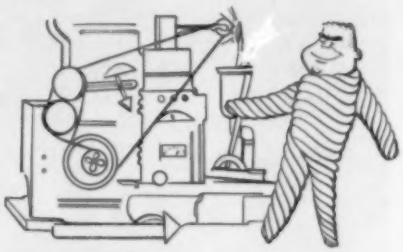
Officials who use the helicopter include Benson H. Lingle, president, Shawville and Lingle Coal companies; James Hudson, superintendent, Shawville Coal Co.; Emerson Amon, superintendent, Lingle Coal Co.; Ralph Lingle, partner, B & R Equipment Co.; Clark Freed, superintendent, River Valley Construction Co.; and Lynn Gilliand, leasing agent.

Tuffy® Wire Rope Tips

To Get The Most for What You Pay Be Sure You Get Correct Rope Lay

Wire Rope is a "Machine" of Moving Parts





...and Every Part Must Fight Destructive Forces

A "look inside" a piece of wire rope reveals a precision-designed assembly of working parts. The parts are core, wire and strand. They are subjected not only to external and internal stresses and strains, but also to heavy surface pressures and abrasions. All these forces may be sustained while the rope is running under very high speeds, and abruptly changing direction of motion. That's why different uses require different constructions of wire rope.

Tuffy Balanced Dragline Rope

Here's highest abrasive resistance with super flexibility. Better spooling. Smoother riding on grooves. And Tuffy Dragline Rope hugs the drum when casting for full load. Gives you longer service life, consistent dependability, in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.

Extra Strength Alone is Not Enough... Wire Rope Must Be BALANCED

Sometimes extra strength is heavily stressed in advertising wire rope. While strength is important wherever wire rope is used, it is not the only important property. And there are cases where too much strength is a liability.

For example, manufacturers of scrapers have designed their equipment to take certain loads. These loads are controlled by, or subject to the ultimate strength of the rope. Larger ropes with higher strength do not break, but *the equipment itself begins to break up.*

Depending on your use of wire rope, the "job prescribed" Tuffy Special Purpose Ropes give you the RIGHT BALANCE of strength, toughness, flexibility for greatest efficiency and longest service life.

Tuffy Balanced Slings & Hoist Lines

"Balanced" because they combine strength, flexibility and toughness in the proper relationship to do a better job longer.

Tuffy Slings and Hoist Lines are a top-performing team in every type of materials handling. The slings are made of a patented, machine-braided fabric that's next to impossible to knot or kink. The hoist lines are a special construction in which strength, flexibility and toughness are balanced.

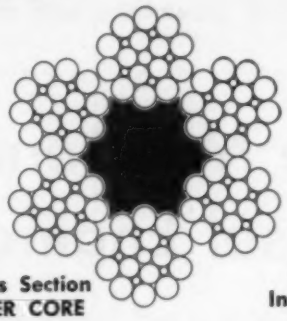
Tuffy Balanced Dozer Rope

Built to give you longer service with less downtime. Mounted on your dozer, a 150' reel of ½" or 9/16" can give you a big bonus of extra service. Here's how: when rope shows drum wear or is crushed on the drum, you feed through just enough to replace the damaged part. You save the 40 to 50 feet ordinarily thrown away. Also available in 300' and 500' reels.

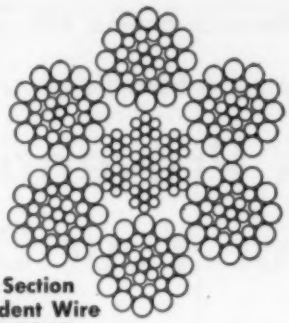
Tuffy Balanced Scraper Rope

"Balanced" construction makes it flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Also gives higher resistance to the shock of load impact on slack line. Moves more yardage per foot because it's specially built to take the beating of drum-crushing abuse.

Let's Take A Look at the CORE of Wire Rope



Cross Section
FIBER CORE

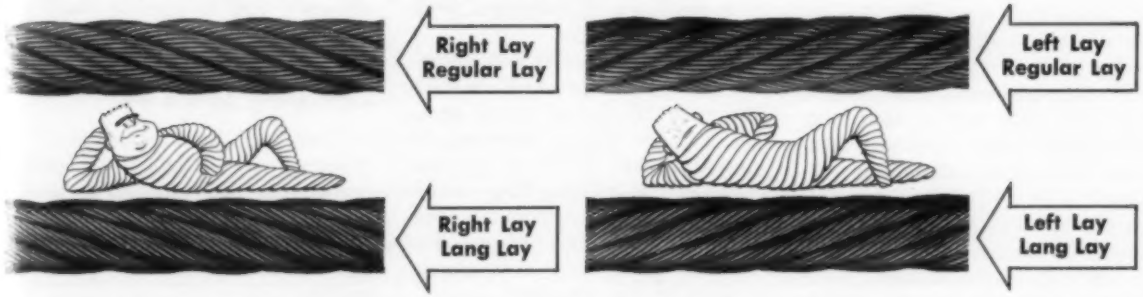


Cross Section
Independent Wire
ROPE CORE

It's either fiber or steel. Fiber cores are usually made from sisal, java, manila or combination of such hard fibers. Steel cores are either wire strand or an independent wire rope core, which amounts to a separate wire rope. The core serves as a base for the strands, keeping the rope in round shape and providing clearance between the strands for freedom of movement.

It's easy to see why wire rope is a "machine"—deserving the same care in selection and use that is given to any fine machine.

Which Lay of Wire Rope is Right for What Use



The "lay" of a rope is described in directional terms. It's a **right lay** when the strands pass from left to right across the rope. It's **left lay** when they pass from right to left.

Wire rope is also either **regular** or **lang lay**. In the **regular lay** the wires are laid in strands opposite in direction to the lay of the strands. In the **lang lay** rope, the wires are laid in the strands in the same direction as the lay of the strands.

Most wire rope is regular lay. It has the greatest stability under the widest range of uses. On the other hand, lang lay is used in applications where greater flexibility and longer wearing services are needed.

FREE!

Complete Splicing and Socketing Manual with engineer's notebook on wire rope constructions and specifications. Write for your copy now. Address Union Wire Rope Corporation, 2130 Manchester Ave., Kansas City 26, Missouri.

Specialists in high carbon wire, wire rope, braided wire fabric, stress-relieved wire and strand.

Good Man to Know: Your Nearby Union Wire Rope Distributor

Whether your wire rope need is a scheduled replacement or a red-hot emergency, your Union Wire Rope distributor is ready. He keeps varied stocks of Union standard constructions and the Tuffy Special Purpose Ropes. And he's backed by quick service from his nearby Union Wire Rope depot.

If it isn't rope you need, but advice on a wire rope problem, he's just as ready to help. If you don't know your Union Wire Rope distributor already, look under "Wire Ropes" or "Slings" in your telephone directory yellow pages.

Your Tuffy Distributor Can Help You Get Longest Service Life and Cut Rope Costs

UNION Wire Rope

New steels are born at Armco

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Southwest Steel Products

4

Maintenance Ideas

Increased engine life, minimum downtime and reduced operating and maintenance costs are benefits of . . .

A Preventive Maintenance Program For Your Diesel Engines

Service Promotion Dept.
Detroit Diesel Engine Div.
General Motors Corp.

AN EFFECTIVE PREVENTIVE MAINTENANCE PROGRAM is based on the performance of specific service functions and accurate record keeping. Records of operational facts and information concerning the engine will eliminate haphazard maintenance guesses, serve as a reminder to operating personnel, retain trained diesel mechanics, lead to better recommendations for improved maintenance and repair and provide management with maintenance records.

A planned PM system for diesel engines includes:

1. Performance of required maintenance at specific time intervals through (a) advance planning and scheduling to eliminate unnecessary and costly delays, (b) maintenance and inspection sheets prescribing services to be performed and (c) work procedure controlled by specific instructions rather than individual judgment.

2. Accumulation of operating and maintenance data made available by maintenance and inspection records which provide a complete record of all PM and service work performed on an engine so that repairs and adjustments can be made by fact rather than guess prior to failure.

To simplify PM procedures four separate maintenance functions are to be used with supporting "log" or operational instruction sheets for each procedure. A general summary sheet is to be included. The first three functions can be performed by a competent operator or mechanic experienced with the particular engine to be serviced.

All operations of each function are listed in sequence with maximum efficiency ratings noted on most engine models. The time interval assigned to each function may be readjusted, if necessary, as experience and operating conditions dictate. These four functions (see accompanying inspection reports) are as follows:

Daily Inspection—Work listed on the daily inspection record should be performed and approved (initialed) by a mechanic or competent workman.

100-Hr Maintenance and Inspection—This inspection should be made after each 100 hr of engine operation, or more often if necessary, by a mechanic or competent workman.

300-Hr Inspection—This should be made by a trained diesel mechanic. Information such as fuel oil purchased and lube oil used to date can be recorded by the workman.

1,000-Hr Inspection—This also should be made by a competent diesel mechanic who has been thoroughly trained in all functions of maintenance and service of the diesel engine to be serviced.

Inspection reports furnish information concerning lube oil consumption, fuel consumption, general engine care and operational data. If the required information is recorded on the proper maintenance and inspection reports it will be possible for a trained and experienced diesel mechanic to determine rate of engine wear, cleanliness of fuel system and actual operating hours of engines between overhauls. The reports can be used to determine the end for minor adjustments.

One of the best methods for avoiding large repair bills is to keep the engine or engines tuned to maximum efficiency and to operate them according to factory-recommended procedures.

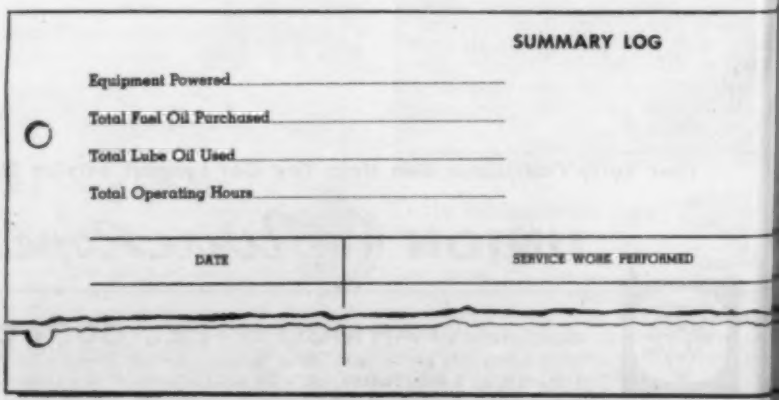
Operating Speed

Most diesels used for industrial applications are designed to operate continuously at 1,800 rpm or under, depending on the type of installation. Operation above 1,800 rpm is considered undesirable for continuous service.

Avoid prolonged periods of operation at or near the engine idling speed. Whenever possible, the engines should be shut down rather than be allowed to idle. If stopping is impossible select as high an idling speed as permissible to maintain efficient engine operating temperatures.

Load Equalization on Multiple-Engine Units

When engines are compounded, it is important to note that the throttles


SUMMARY LOG

Equipment Powered

Total Fuel Oil Purchased

Total Lube Oil Used

Total Operating Hours

DATE | SERVICE WORK PERFORMED

500 HOUR MAINTENANCE AND INSPECTION RECORD

Total Operating Hours to Date_____ Date_____ (of this report)

	UNIT NUMBER				
1	Perform all operations listed under 100 Hour Maintenance Inspection				
2	Check cooling system				
3	Clean air box				
4	Lubricate starting motor				
5	Lubricate battery charging generator				
6	Clean primary fuel strainer element or replace primary fuel filter element				
7	Change secondary fuel filter element				
8	Drain water and sediment from fuel tank				
9	Lubricate clutch mechanism, check adjustment				
10	Change torque converter oil*				
11	Inspect power generator bearing cavity				
12	Inspect power generator commutator				
13	Inspect power generator brushes				
14	Tune-up engine				
15	Check daily and weekly records				
16	Make suggestions for improving maintenance				
17	Service work needed				
18	Service work completed—Signed:				
19	Fuel oil used to date				
20	Lube oil used to date				
21	Comments:				

Signature_____

NOTE: For extended periods of operation it may be necessary to make inspections at more frequent intervals.

*See "Torque Converter" in Operating Instructions.

500 HOUR MAINTENANCE AND INSPECTION RECORD

1000 HOUR MAINTENANCE AND INSPECTION RECORD

Total Operating Hours to Date_____ Date_____ (of this report)

	UNIT NUMBER				
1	Perform all operations listed under "500 hour inspection"				
2	Change gear box oil (heavy duty operation)				
3	Inspect cooling system—drain and refill as required				
4	Add rust inhibitor to cooling system (as required)				
5	Check compression pressure (all cyl. as required)				
6	Check injectors (as required)				
7	Inspect cylinder liner ports and piston rings				
8	Inspect and clean blower screen				
9	Check and record air box pressure (rated RPM)				
10	Check and record crankcase pressure (at rated RPM)				
11	Check and record exhaust back pressure (rated RPM)				
12	Check fuel oil return				
13	Check load equalization (multiple units)				
14	Check all log sheets				
15	Leave written instructions for improving maintenance				
16	Service work needed				
17	All service work completed				
18	Comments:				

Signature_____

NOTE: For extended periods of operation it may be necessary to make inspections at more frequent intervals.

1000 HOUR MAINTENANCE AND INSPECTION RECORD

ENGINE OPERATION AND MAINTENANCE INSPECTION FORMS serve as a guide in arriving at a preventive maintenance program for diesel engines.

ENGINE OPERATION AND MAINTENANCE RECORD

Week Ending_____ (Date)

CHECK THESE ITEMS DAILY. For extended periods of operation more frequent check is required.

UNIT NUMBER	Engine Oil Pressure	Engine Water Temperature	Generator Charging Rate	Torque Converter Oil Temp.	Fuel Oil—Gallons Used	Sediment From Fuel Filters	Check Lube Oil Level—Quarts Added	Check Air Cleaner—Service	Grease Clutch Throw-out Brng.	Gear Box Oil—Quarts Added	Torque Converter Oil—Pints Added	Check Power Generator Oil Level	Check Water Level in Radiator	Check Battery	General Operation of Engine	No. Hours Operated	TOTAL OPER. HRS. THRU PREV. WEEK / OPERATOR'S SIGNATURE BELOW
SUN.																	
SAT.																	

100 HOUR MAINTENANCE INSPECTION RECORD

	UNIT NUMBER					Total Useage for Week			Total Hours to Date
						Unit No.	Fuel	Lube	
1	Change lube oil filters and eng. lube oil								
2	Service gear or convertor oil strainer								
3	Lubricate battery charging generator								
4	Check and lubricate throttle linkage								
5	Grease tachometer drive assembly								
6	Grease P.T.O. and outboard bearing								
7	Check air box drains								
8	Clean radiator, externally*								
9	Check all belts, drives and pulleys								
10	Check all electrical connections								
11	Make general inspection of engine								

REMARKS:

*More frequently if necessary.

Signed_____ 100 HOUR

Unit No._____

SUMMARY

are connected in such a manner as to provide for control of the individual engines so that each will carry its share of the total load. The linkage between the throttle and governors is made adjustable to divide the load equally. This adjustment should be made by a trained diesel mechanic only at the time of tune-up.

Air Cleaner

An air cleaner is useful only if it removes foreign matter from air being supplied to the engine. If the cleaner is not properly maintained the filter oil sump will become filled with sludge and the screens or elements will not remove dust properly. Dust entering the engine will restrict air flow through the air-intake system. Horsepower, fuel consumption and engine durability are affected by dirty air-cleaners.

The length of service for air cleaners cannot be definitely stated since it depends on the type of cleaner and the conditions under which it must operate. An engine operating in a dusty place will need to be cleaned more often than an engine operating in clean air. The most satisfactory service period can be determined by frequent inspection of the cleaners and air ducts and then setting a service period that best suits the requirements of the operation.

The recent addition of dry-type air cleaners as original equipment has in general reduced service and maintenance requirements of air cleaners.

Exhaust System

The exhaust system of a diesel engine performs an important function. It is vital that exhaust restrictions be kept to a minimum. The engine can then discharge gases produced by combustion more easily, thus making way for clean fresh air in the cylinders so that the next combustion cycle can burn the fuel efficiently. Mufflers and exhaust piping should be checked periodically to see that they are not clogged. Most mufflers have a 8-in diameter hole which serves as a drain for condensation collected within the muffler. If this hole is not in the muffler one should be made, preferably at the lowest end to provide a natural drain. The ends of vertical exhaust stacks should be provided with rain caps or some other means of keeping rain water out of the engine when units are not running.

Cooling System

Proper care and maintenance of cooling systems are essential. Clean, soft water should be used at all times. For winter operation, a reliable permanent antifreeze should be used. The cooling system including radiator and engine should be cleaned and flushed every spring and fall. Rust inhibitors should be added to the cooling system when antifreeze is not used. Any foreign matter, such as, grass, leaves, etc., should be removed from the outer surface of the radiator core every 100 hr or more frequently if necessary.

Operating Temperature

A diesel engine performs best when operated within the recommended temperature range as specified by the engine manufacturer. Cold engines do not burn fuel completely. This means more fuel to do the same job. Water temperatures should be recorded and checked at frequent intervals during each shift.

Fuel Oils

Suitable fuel oils must be clean, completely distilled, well refined and noncorrosive to fuel system parts. These are dominating factors for obtaining satisfactory life for high-speed diesel engines. Distillation range, cetane numbers and sulfur content are the most important properties to consider in selecting a high-speed fuel.

To permit efficient combustion the fuel oil selected must meet the volatility and ignition quality requirements of the engine. These are largely governed by speed, load and atmospheric temperature. To avoid excessive deposit formation and premature wear the sulfur content of the fuel oil must be as low as possible.

During cold-weather operation the "cloud-point"—temperature at which wax crystals begin to form in the fuel oil—must be below the lowest expected fuel temperature to prevent clogging fuel filters.

Fuel-Oil Filter

Good quality fuel oil is practically free of water, sediment and foreign matter after it is refined. However, from the time the fuel is refined until it reaches the engine a certain amount of contamination is unavoidable. This contamination must be removed before it reaches the fuel pump and injectors. Two stages of filtration are provided on most diesel engines, as follows:

1. A primary fuel strainer or filter between the fuel tank and fuel pump.
2. A secondary fuel filter between the fuel pump and the injectors.

The primary filter removes foreign matter which could damage the fuel pump or cause rapid clogging of the fuel filters. The secondary filter removes minute impurities which could seriously damage injectors. These filters are adequate for removing contamination under normal operating conditions where reasonably clean fuel is used. Although suggestions are made for periodic servicing of filters the periods will vary under different operating conditions.

Lubricating Oil

Superior oils provide better lubrication, offer greater heat resistance and counteract sludge formation more effectively than ordinary motor oils. "Heavy-duty" lubricants should be used in diesel engines to increase engine life and performance.

Several types of detergent lubricants are available for the varying service requirements of gasoline and diesel engines. Almost without exception each diesel manufacturer has definite lubricating recommendations to insure the best operation and extend engine life. These recommendations should be followed. However, heavy-duty lubricants of the "Supplement 1", Type (S-1) are generally used. If fuel oils with less than 0.5% sulfur content are used MIL-L-2104A-type lubricants may be used satisfactorily. When fuel oils with a sulfur content approaching 1.0% are used S-3 lubricants will be better.

The proper viscosity grade when operating at normal temperature is SAE 30W. When prolonged exposure of the engine to temperatures below freezing is unavoidable it is suggested that the following lighter grades be used to facilitate starting:

Ambient Temperature	Viscosity Grade
+30 to 0 F	SAE 20W
0 to −20 F	SAE 10W

All mineral oils deteriorate after prolonged use. Crankcase oil should be renewed at regular intervals to dispose of the acidic and resinous materials. The frequency of oil changes depends upon the lubricant, the severity of engine service and the efficiency of filtration.

It is suggested that new engines be started with 100-hr oil-change periods. The drain interval may be increased gradually following the recommendations of the oil supplier—based on analysis of the drained oil—until the most practical oil-change period has been established.

Flushing oils or solvents should not be used where there is danger of diluting the fresh refill oil.

Oil Filter

With use of detergent oils the color of lubricants has lost value as an indicator of oil cleanliness or proper filter action. Due to the exceptional ability of the detergent compounds to hold minute carbon particles in suspension, heavy-duty oils will always appear dark colored on the dipstick.

Heavy sludge deposits found on oil-filter elements at the time of an oil change must be taken as an indication that the detergency of the oil has been exhausted. When this occurs the oil-drain interval should be shortened. The removal of abrasive dust, metal particles and carbon are assured by replacing the oil-filter element at the time of oil change.

Selection of a reliable oil supplier, strict observance of recommended oil-change periods and proper filter maintenance will insure trouble-free lubrication and longer engine life.

Torque Converter

Satisfactory operation of torque converters can be achieved by following manufacturer's lubrication instructions. Fluids other than the recommended heavy-duty lubricants are to be used only with the approval of the oil supplier.

Torque-converter trouble can be avoided by observing the following maintenance suggestions:

1. Check torque-converter oil level daily with engine stopped or running, whichever the manufacturer recommends.

2. Renew oil at manufacturer's recommended change periods.

3. Check operating temperatures of oil. Do not exceed specified temperatures.

Mechanical Clutch And Gear Box

Power take-off clutches, reduction gears and transfer gear cases should be lubricated periodically. The clutch mechanism operates dry or wet, depending on design. Necessary lubrication and adjustments should be made in accordance with manufacturer's specifications. Grease fittings are generally provided for external lubrication. Reduction gears and transfer cases provided with integral oil sumps should be checked for proper oil level and the oil changed periodically. Outboard bearings, if installed, should be lubricated at regular intervals, taking special care to avoid overgreasing.

Power Generator

The power generator will normally require little maintenance to keep it in top operating condition. There are a few periodic inspections outlined by the manufacturer which, as a matter of good practice, should be performed.

For DC machines the commutator should be visually inspected for loose, pitted or scored bars and high mica. For AC machines the collector rings should be checked for pitting or scoring. The exciter commutator should be checked for loose, pitted or scored bars and high mica. Brushes should be replaced in DC and AC machines when necessary.

PM Roundup

If a PM program is started when the engine is first installed, maintenance and repair costs will be greatly reduced. If the program is instituted after the engines have been neglected, repairs must be made and the results of negligence corrected before preventive maintenance can be of much help.

The cost of replacement parts and labor and loss of revenue caused by negligence is a major item of operating expense. However, these sources of expense can be controlled by observing a few simple rules:

1. Reduce the wear of moving parts by (a) using fuel and lube oils that meet the specifications of the engine manufacturer, (b) maintaining cleanliness, (c) operating within recommended temperature range and (d) operating the units according to operating instructions issued by he manufacturer.

2. Avoid costly emergency repairs by practicing preventive maintenance.

3. Reduce parts replacement by making minor adjustments and corrections before major breakdowns occur.

4. Increase engine life by (a) using genuine factory parts and (b) having replacement parts installed to factory specifications by up-to-date work methods.

The life of a diesel engine depends largely upon the operator and trained mechanics. If they perform their responsibilities well you can expect satisfactory operation of the engine.

Selection and Use of Electrical Instruments

PERFORMANCE OF ELECTRICAL POWER SYSTEMS AND APPARATUS depends on, among other things, instruments to measure voltage, cufrent, power, power factor and so on. Instruments are used in all phases of electricity, i.e., from generating station to utilization. They let you know what is going on inside your motors, transformers, cables and other types of electrical equipment.

Construction of instruments varies. Ruggedness and dependability are important factors when instruments are to be used for maintenance. Accuracy of inexpensive instruments generally is sufficient for maintenance purposes. Equally important is the care and use of these instruments to get accurate readings and long life.

How to Apply and Service Mercury Switches

What are mercury switches? . . . How do they operate? . . . Why are they used on mining machines? . . . How do you take care of them? . . . Here's the what, why and how.

MERCURY SWITCHES play an important part in the operation and control of mining equipment. They now find more frequent use in control-circuit designing because they offer more advantages than other control-circuit contacts and timing relays. They provide other benefits in mining, where dust and moisture affect the operation and increase the maintenance requirements of the older air-gap types.

For best operation and cheapest upkeep the purpose, construction, operation and testing procedure of mercury switches should be thoroughly understood.

Purposes and Advantages

Mercury switches control circuit interlocking, overloading and timing. Interlocking is necessary to prevent reverse and forward or series and parallel contactors from operating simultaneously. Serious damage to contactors and motors will result if this safety feature is not maintained.

Motors are protected against excessive overload by using mercury switches which trip main contactors when more than rated motor current flows through the mercury-switch overload coil.

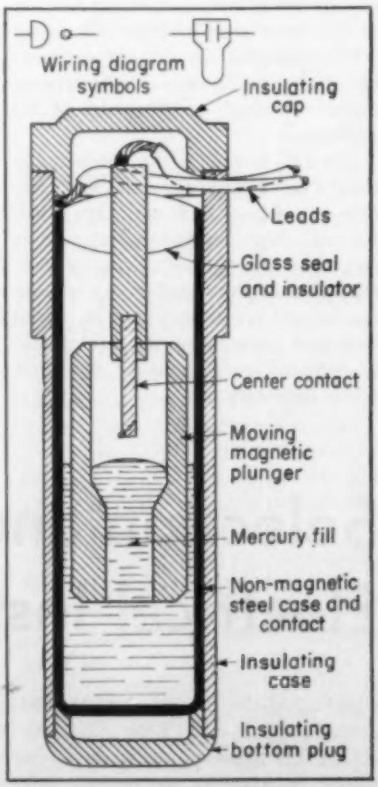
Proper timing of contactors is accomplished by selecting switches of the desired time intervals. Motors which power mine machinery are started on reduced voltage—through resistance—or in series and then in parallel. (Motors started in series have the same effect as those started on reduced voltage.) The time interval between starting and full speed of motors is controlled by mercury switches with built-in time delays.

The advantags of the mercury switch are:

1. **Few Failures**—The switch is sealed against dirt and moisture and precision adjustments are not required to obtain accurate timing. A predetermined timing device is built into the tube.

2. **Reduced Maintenance**—It is a stationary-mounted device with all moving parts enclosed.

3. **Efficient Operation**—It is unaffected by normal changes in operating voltage, excessive vibration, and machine tilting up to 30 deg.



NORMALLY OPEN-INSTANTANEOUS CLOSING SWITCH for electrical interlock. Magnetic flux produced by operating coil forces movable plunger down, causing mercury to raise, thus closing circuit between center electrode and steel case.

Construction

The complete switch consists of two parts, as follows:

1. The mercury switch itself, which is constructed of a nonmagnetic stainless steel tube, serves as an electrode. The other electrode is located in the center of the tube and insulated from the outer electrode. Mercury in the bottom of the tube acts as the connector between electrodes. A movable magnetic plunger controlled by a magnetic field raises or lowers the mercury pool, thus making or breaking contact.

2. Holders or magnetic auxiliaries. These serve three purposes: (a) to hold the switch, (b) to mount the switch on contactors and (c) to provide a path for the magnetic flux.

Brass screws and other nonmagnetic materials are used in construction to prevent magnetism from being conducted away from the switch. Magnetic material is used only to provide a direct path for the magnetic flux to the switch.

Operation

The four types of mercury switches (illustration courtesy Joy Mfg. Co.) used on mining equipment are:

1. Normally open — instantaneous closing for electrical interlock.
2. Normally open—delay closing for timing.
3. Normally closed—instantaneous opening for electrical interlock and trip overload.
4. Normally closed—instantaneous opening for adjustable-trip overload relay.

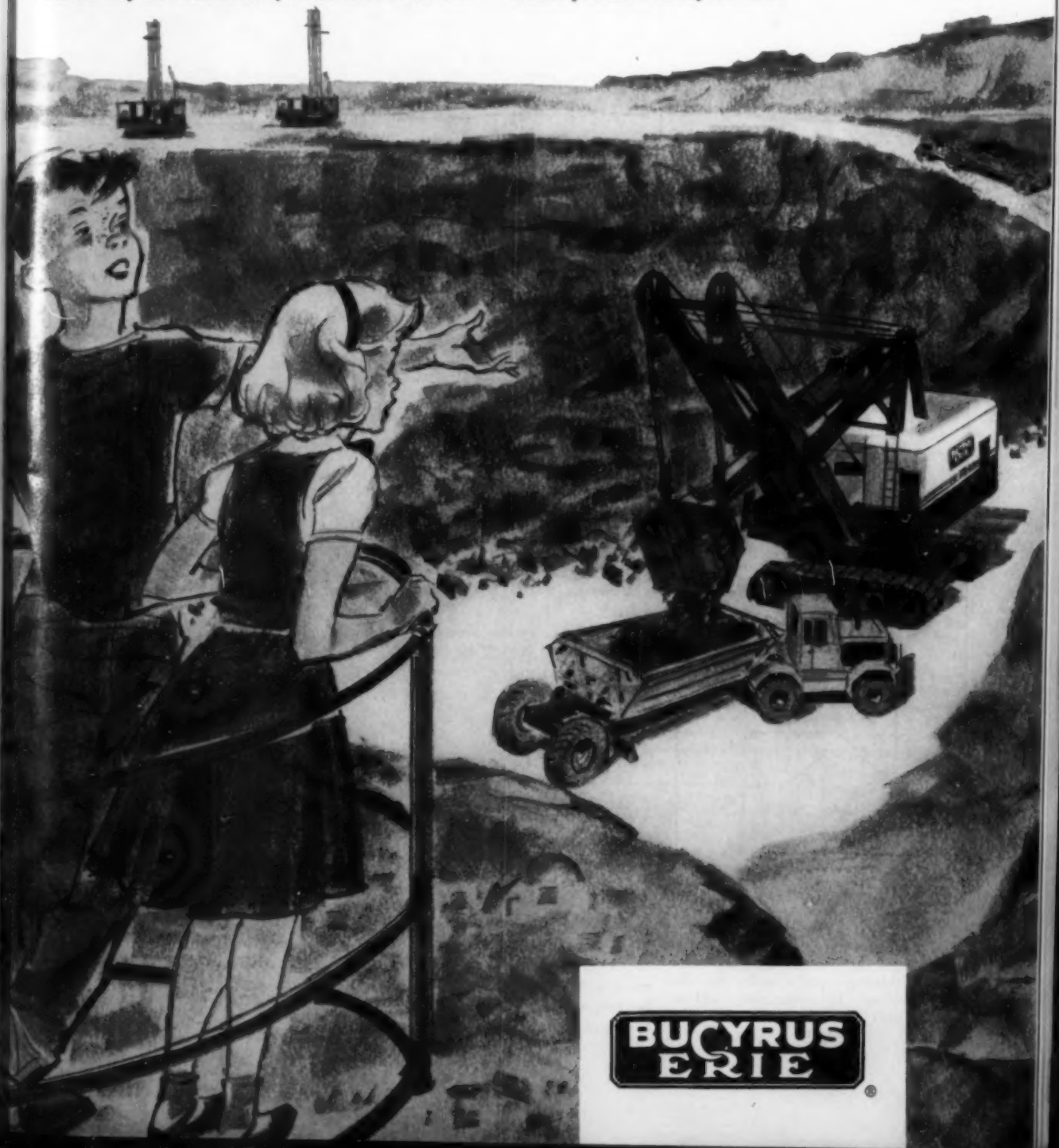
The successful operation of mercury

"when I grow up I'm going to run one of those"

When a fellow daydreams out loud to his best girl, he dreams *big*. Running a big Bucyrus-Erie electric shovel means he's really arrived!

Many a mine or quarry owner who's now "arrived" got his start years ago with Bucyrus-Erie electrics.

That's why two out of every three shovels on the great iron ranges of northern Minnesota and upper Michigan are Bucyrus-Eries. It's also why B-E machines have long been *the standard* in large quarries, in open pit mines, and on the biggest dam and construction projects all over the world. *Wherever important jobs require the best equipment* — that's where you'll see Bucyrus-Erie.



BUCYRUS ERIE®

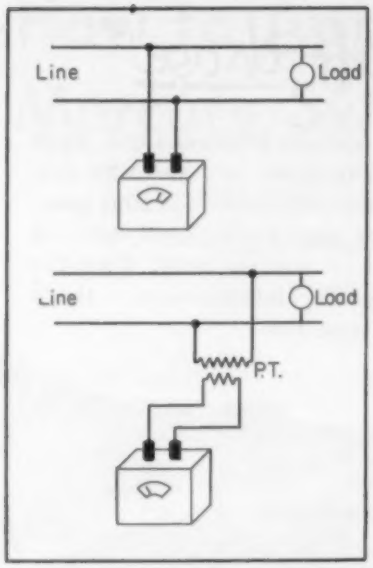


FIG. 1 shows how an ammeter is connected in a circuit. It is always connected in series with the load and never across it. Current transformers also are used with ammeters.

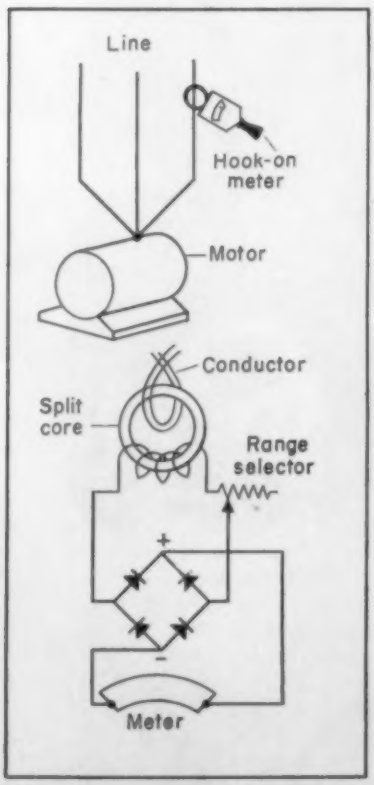


FIG. 2 is a variation of the ammeter. It is the hook-on type which measures current quickly without opening connections. Multiple scales make possible close readings in wide range. Most models, with leads, also serve as voltmeters.

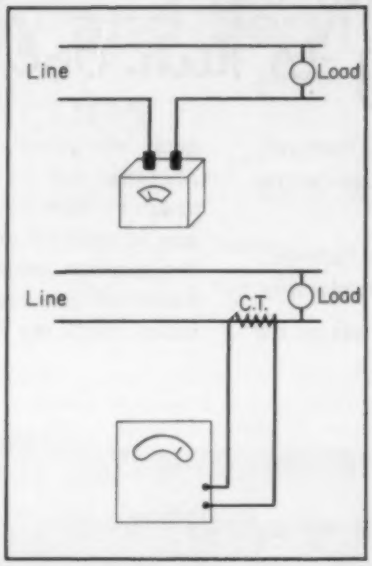


FIG. 3 illustrates how a voltmeter is connected in a circuit. Unlike the ammeter, the voltmeter is connected across the load and never in series. Potential transformers also are used with voltmeters.

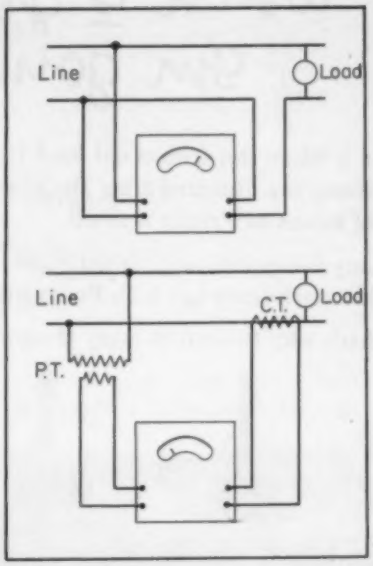


FIG. 4 shows a wattmeter, which is used to measure power. Basically, this instrument is a combination voltmeter and ammeter. Connections for the voltage side of the wattmeter are across the load and the ammeter connections in series with the load. Current and potential transformers also are used with wattmeters.

Instrument Selection

There are several questions that should be answered before an instrument is purchased. Some of these are:

1. What accuracy is required?
2. Is the instrument to be used on AC or DC circuits and equipment?
3. Should it be portable or stationary?
4. Should it be indicating or recording?
5. What range or rating should it cover?
6. Under what conditions will it be used?

Once the preceding questions have been answered it will be possible to select the instrument that will meet your needs as well as give years of service—but only if it is used properly.

Application

The first responsibility of a person who has just purchased an instrument is to read the manufacturer's instruction book carefully, even to the point of memorizing it. Secondly, it should be handled carefully to avoid vibration or shock.

Before an instrument is connected to a circuit or apparatus, the user should always check and estimate the value of the current, voltage, etc., to be measured. This can be done by checking the nameplate data on the apparatus on which measurement is to be made. If an instrument has more than one tap or range, make connection to the highest range first to avoid injury to the instrument. Always double check to make sure that the instrument is set on the correct range as well as the correct factor to be measured—voltage, current, resistance, etc.

The pointer of an instrument should be checked before readings are made. If the pointer is off zero, reset to zero by adjusting the external zero shifter.

Another important factor in instrument use is to keep them away from strong electrical fields, such as near cables or bus bars. Presence of a magnetic field affects the reading and will indicate a false value.

Always connect the leads to the instrument first. This will eliminate energized leads from coming in contact with each other.

The most accurate readings can be obtained by selecting a scale on the instrument where the pointer values are between one-half and three-fourths full scale. The instrument readings should be taken directly over the scale while the instrument is in a horizontal position to avoid errors.

How Tom Orlovsky keeps shuttle cars shuttling

Shuttle car rolls. Grinds. Whines. Tugs.

Torture for cable. Scrape. Twist. Soak. Crush. Bend.

Can the cable take it? Tom Orlovsky, Rome Cable salesman in the Huntington, West Virginia area, says *yes* . . . if it's Rome 60 Duplex shuttle car cable.

He has good reason. No matter how you twist or flex this rugged cable, the sheath won't separate from the conductors. Sheath, web, power conductors and ground are an integrated unit.

For instance—the cable's rugged neoprene jacket and braided conductors are *meshed* together to prevent the conductor from slipping. An increased number of strands in the ground conductor and power conductors make it highly *flexible*. And a closely woven fibrous covering on the ground conductor minimizes the mechanical working of individual strands.

Rome's shuttle car cable may be just what *you* need to keep cars shuttling in your mines. Get a two-foot sample length from your Rome Cable salesman; test it yourself.

No damaging bend—just a flip-over. When flexed in use, Rome 60 Duplex flops over and bends on its minor axis. Its interlocked construction forces the change and causes a flip-over, **not** a breakdown.

◀ **Tom Orlovsky, Rome Cable salesman,** has his home and headquarters in Huntington, W. Va.—where he answers the needs and problems of West Virginia mines. Before coming to Rome, Tom spent time as an electrical contractor, electrical shop foreman, and manufacturer's representative—qualifying him to recommend the **right** electrical system for you.

MEET THE MAN
WHO'S DEDICATED TO **YOUR** JOB
YOUR ROME CABLE SALESMAN

ROME CABLE Department 15-10
Rome, New York

☐ Please send me a sample of Rome 60 Duplex cable.

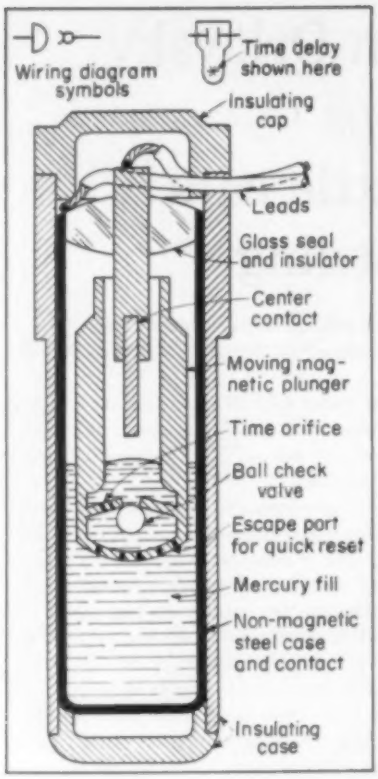
☐ I want to "Meet The Man" who can tell me more.

Name.....

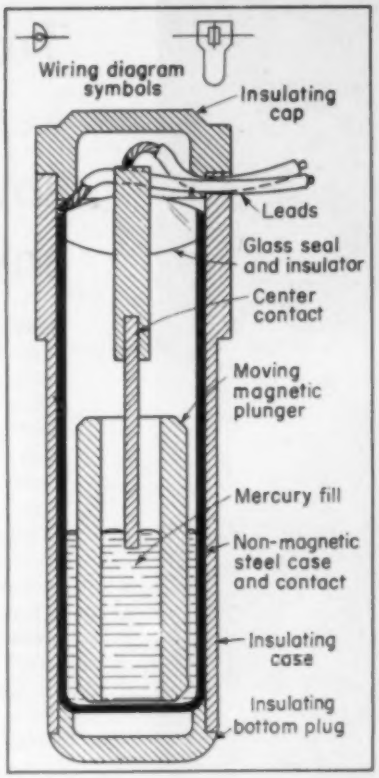
Title..... Company.....

Street.....

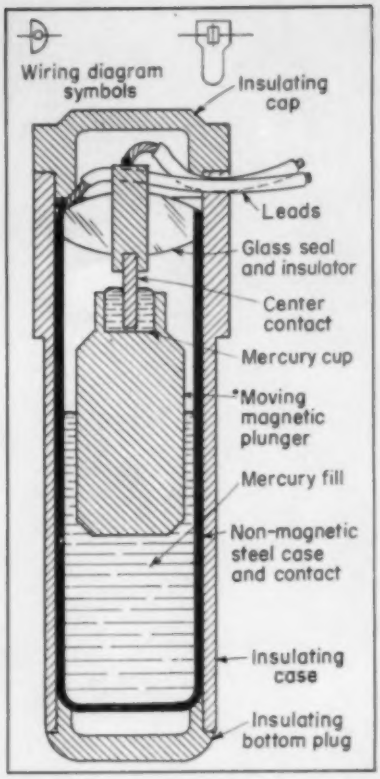
City..... Zone..... State.....



NORMALLY OPEN-DELAY CLOSING SWITCH for timing. Magnetic flux produced by operating coil forces plunger down, causing mercury to flow inside the movable plunger through timing orifice until contact is made with center electrode. When flux is removed, mercury empties from inside plunger through ball check and escape port, breaking contact of center electrode and mercury.



NORMALLY CLOSED-INSTANTANEOUS OPENING SWITCH for electrical interlock and trip overload. Magnetic flux produced by overload or operating coil forces plunger upward, thus lowering level of mercury and opening circuit between center electrode and steel case. Contact closes after flux is removed.



NORMALLY CLOSED-INSTANTANEOUS OPENING SWITCH for adjustable-trip overload relay. Magnetic flux produced by overload coil forces plunger down, opening circuit between mercury cup and center electrode. Movable plunger is forced below surface of mercury, refilling cup at each operation.

switches depends on several important factors. Operation requires part of the magnetic flux produced by an operating coil or overload-trip coil and consequently the switch must be mounted near the coil. Mounting is either on the right or left of a single-pole contactor or between a double-pole contactor.

They are positioned on the contactor assembly in such a way that the bottom plate of the mercury auxiliary lines up with the armature extension or movable contactor assembly. When the operating coil is energized the armature moves upward, making contact with the movable and stationary contact tips. At this point the bottom plate and the armature extension almost touch each other. The space between the plates is called the air gap. It should be adjusted to a thickness of 0.003 or 0.005 in. A feeler gage should be used in making the adjustment. Accurate adjustment can be made with special shims.

Low voltage will cause the switches to operate improperly. The lower the voltage the lower the magnetic flux. Therefore, good face voltage must be maintained.

Operation of the normally open-instantaneous closing switch requires sufficient magnetic flux from the operating coil to pull the plunger to the bottom of the switch. This raises the level of mercury until electrical contact is made. Deenergizing the operating coil breaks the contact. This releases the movable plunger, lowering the mercury.

Motor controls featuring time-delay switches are available in seconds or fractions of a second. Construction is similar to other switches with the exception of the movable magnetic plunger which controls the mercury in the switch. A timing orifice regulates the flow of mercury to the inside of the plunger. The orifice permits enough mercury to enter during a definite time interval to make contact between the electrodes. When the magnetic field is broken a ball check valve releases the mercury, breaking contact. Since timing is controlled by gravity and the size of the orifice, voltage changes do not affect operation. Timing delays of various duration are available. The size of the orifice determines the length of the delay.

As noted in the list of the four types of mercury switches, there are two normally closed-instantaneous opening units. The difference is in the weight of the plungers. The switch with the heavier plunger is used in overload relays, while the unit with the lighter plunger is used for electrical interlock. Since they are normally closed the plungers rest on the bottom of the switch. When the switch is energized the plunger raises, lowering the mercury and breaking the contact.

a brand new 5 year old!

Here are just a few of the many features that put this new C-6 "Euc" years ahead of competitive crawlers:

Proven Torqmatic Drive . . . performance tested and proved in thousands of Euclid earth-movers on the toughest jobs.

Full Power Shift . . . no master clutch . . . easy operation and "fast as a fox" maneuverability that cuts work cycle time.

Fast, Positive Response . . . common steering and braking control, plus Torqmatic Drive for smooth operation on all tractor work.

Better Track Alignment . . . track roller frames are pivot mounted ahead of final drives . . . advanced design of front equalizer bar maintains positive alignment.

Low Maintenance Costs . . . easy accessibility of major components . . . no adjustment of steering clutches and brakes required . . . fewer lube points . . . dry type air cleaner . . . 7 track rollers . . . no tractor weight on final drives . . . recoil system eliminates mechanical springs.

No other Euclid product has ever had the thorough testing—both on proving grounds and on actual jobs—that the C-6 tractor has undergone during the last 5 years. All of the product refinements and improvements resulting from this exhaustive test program, plus Euclid's really new concept of crawler design, make C-6 performance a new standard for comparison in the 200 h.p. tractor class.

Have your Euclid dealer give you the facts and figures on the C-6 . . . compare performance as well as specs with any tractor in its class and you'll see what this new standard of tractor versatility can mean to you in better production and return on investment.

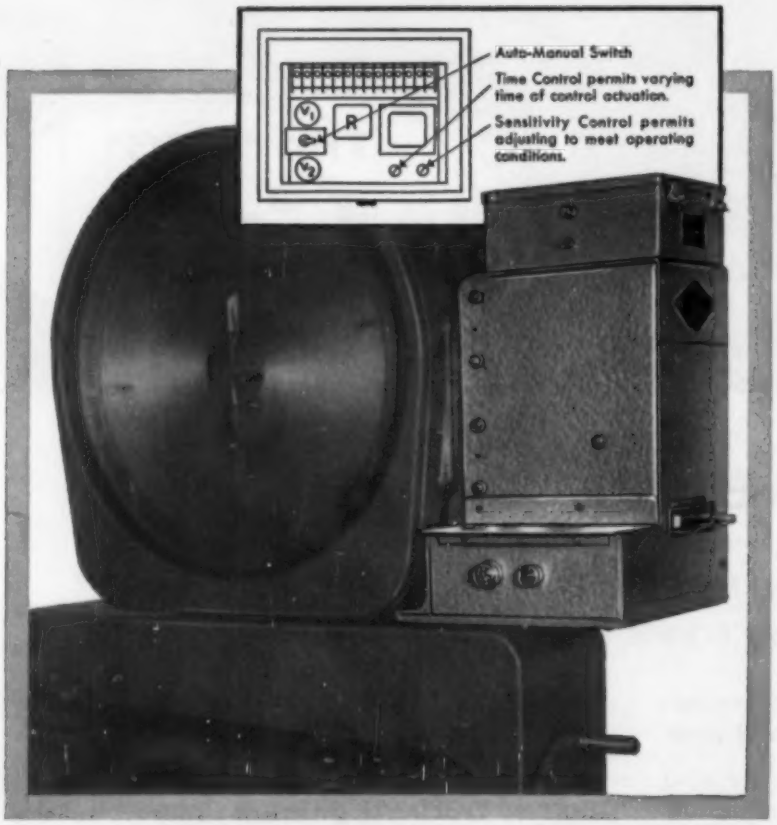
EUCLID Division of General Motors, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

NEW Fairbanks-Morse Electronic Weight Detector


Auto-Manual Switch
Time Control permits varying time of control actuation.
Sensitivity Control permits adjusting to meet operating conditions.
R

Prevents incorrect weighing . . . stops costly errors!

With the new Electronic Weight Detector, true weight of any load can be automatically obtained and recorded without need of a weighman. Where a weighman is used, it is impossible for him to record incorrect weights or start a sequence at the wrong time. When desired, a flip of the switch can disengage the Weight Detector entirely from the system. *This is the first fully-reliable control of its kind available in the scale industry.*

To completely automate your weighing—to be sure that your weights are correct—to protect yourself by completely policing your entire weighing operation—contact your nearby Fairbanks-Morse Field Engineer, or write directly to Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Illinois for complete information.

See Sweet's Plant Engineering File for full line of F-M Scales

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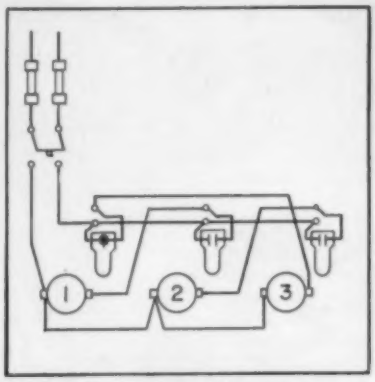
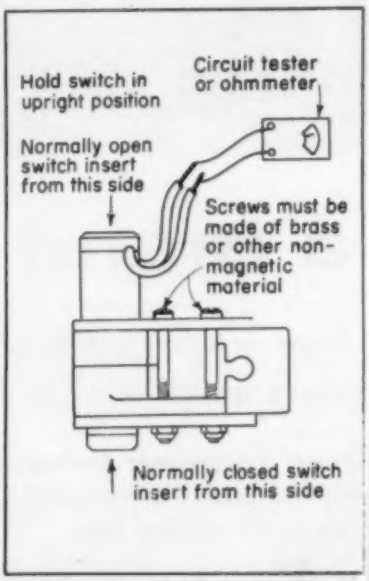
a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL, DUAL FUEL AND GAS ENGINES • ELECTRIC MOTORS
GENERATORS • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

Maintenance Ideas



ELECTRIC TESTING PANEL can be constructed for shop use. Normally closed and normally open switches can be checked with this device.


Hold switch in upright position
Circuit tester or ohmmeter
Normally open switch insert from this side
Screws must be made of brass or other non-magnetic material
Normally closed switch insert from this side

PERMANENT MAGNETIC SWITCH TESTER and an ohmmeter can check switches where power or contactors are not available.

A variation of the normally-closed switch is adaptable to the adjustable-trip overload relay. Here the plunger floats and is equipped at the top with a mercury cup which makes contact with the center electrode. When an overload is created in the circuit, the switch is energized and pulls the plunger down, breaking contact.

An adapter called an "instantaneous operator," which is mounted on the mercury auxiliaries, can speed up the operation of transferring contactors from various positions. This device permits the switch to function

as soon as the operating coil is energized instead of waiting until the contact closes.

Testing

Special emphasis should be placed on the proper testing of mercury switches. It is impossible to estimate the number of good switches tossed aside yearly by maintenance men simply because they have no accurate way of testing them.

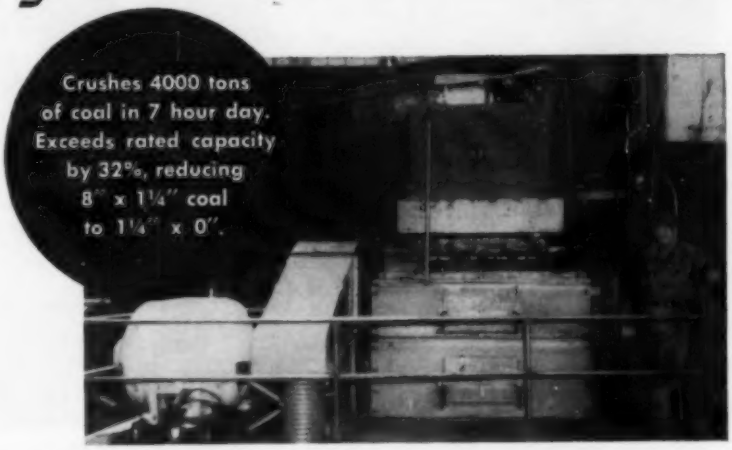
There are several ways to test mercury switches. One is the sequence test. In this test the individual controls of the machine are manipulated while power to the motors is blocked. An insulator is placed between the contact tips of the main power contactors. Then the main switch is held in while the sequence test is performed. The operation can be repeated any number of times. It also has the advantage of testing the switches with actual face voltage.

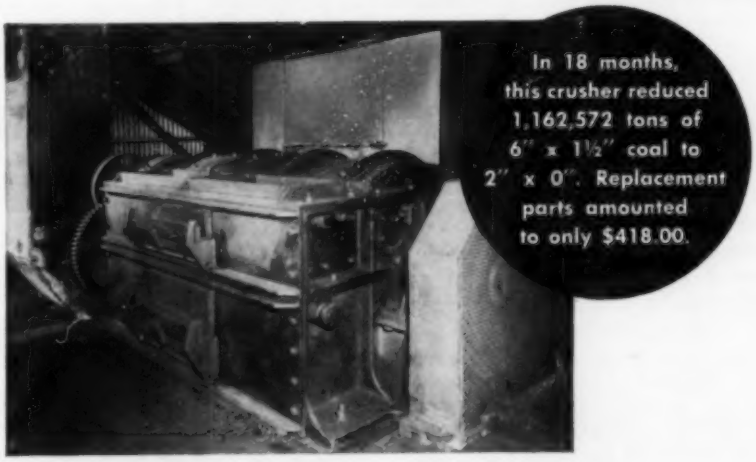
A mechanical test unit is available and can be purchased from manufacturers of mercury switches. The unit is no more than a regular magnetic auxiliary equipped with two permanent magnets. An ohmmeter is used in conjunction with the unit. Leads from the mercury switch are connected to the ohmmeter. The switch is then placed in the magnetic auxiliary. The ohmmeter will indicate when and if the switch operates. When normally-closed switches are tested with this unit it must be turned upside down.

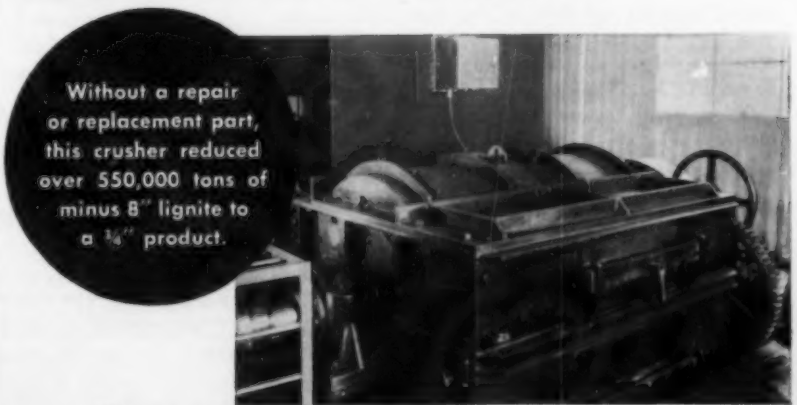
An electrical test unit can be constructed to test all switches in the shop. It is wired to operate in sequence in much the same manner as the sequence test previously described. As noted in the accompanying diagram, normally-closed switches are tested at Contactor 1 and normally open switches at Contactors 2 and 3. Since the sequence operation will stop when one of the switches fails, the faulty switch can be determined by the position of the contactors. This unit can be placed in operation and allowed to continue until the test is completed or the switch is found to be bad.

There is not too much that can cause a switch to go bad. The most common causes of failures are excessive current, long usage, or possible damage to the steel case. Loose leads can cause temporary failure.

CRUSHING FACTS
on *American* COAL CRUSHERS







When you figure costs, the best results come from American Rolling Ring Crushers

American PULVERIZER COMPANY

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

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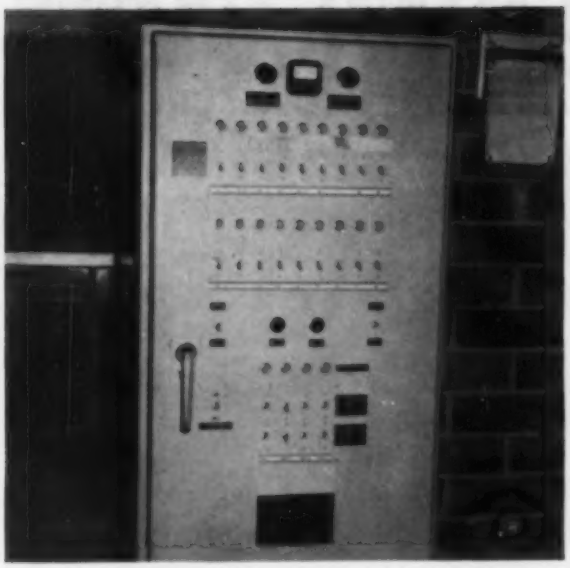
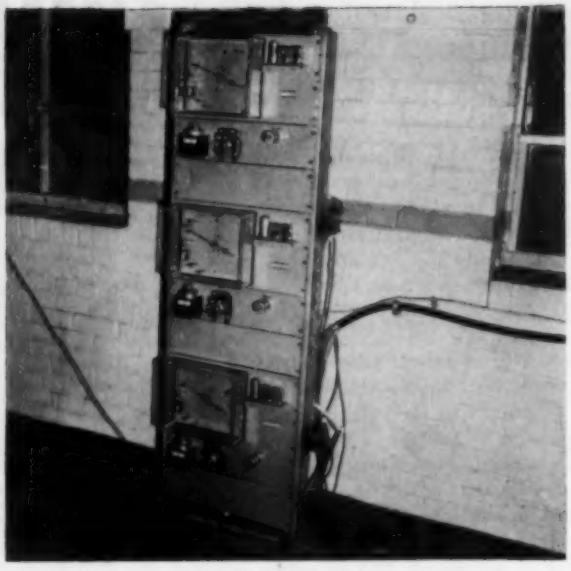


CENTRAL CONTROL PANEL for Jones & Laughlin's Vesta No. 5 scanner system is located at Donahoo shaft in lamproom. As many as 32 functions can be monitored in 2-min period.



TYPICAL substation installation includes circuit scanners for two circuit breakers and two fans. System automatically opens all power breakers if unit become inoperative.

Central Circuit-Scanning System

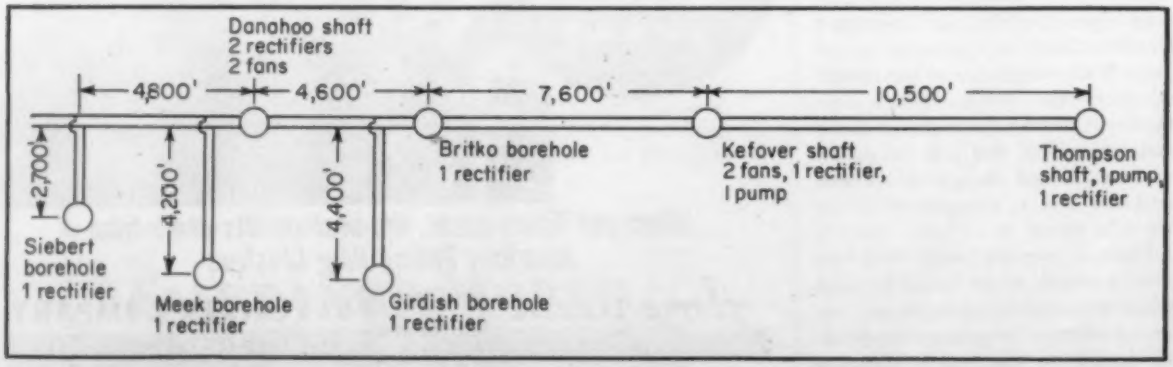
By **W. G. Kegel**
General Master Mechanic
Vesta-Shannopin Coal Div.
Jones & Laughlin Steel Corp.
California, Pa.

POSITIVE, AUTOMATIC AND CONTINUOUS monitoring and control of outlying sub-stations and fans is achieved with a central circuit-scanning system at Jones & Laughlin's Vesta No. 5 mine. The primary function of the system is to automatically shut off all power going into the mine if there is a fan failure. In addition, the system provides:

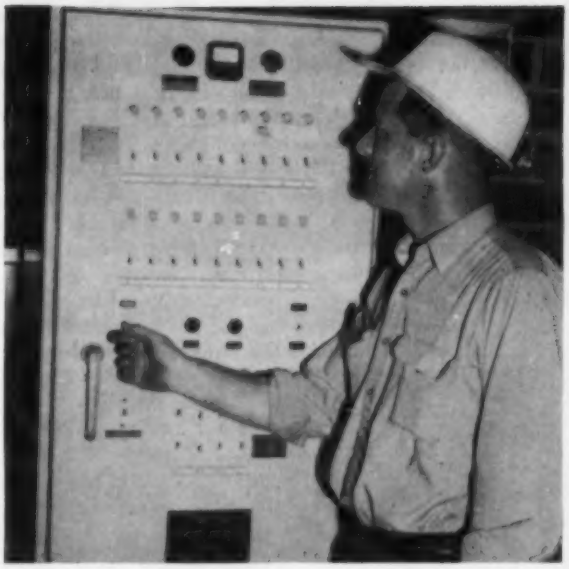
1. Continuous monitoring of fans
2. Monitoring, on a programmed schedule, of all circuit breakers
3. Centralized remote control of all circuit breakers
4. Centralized remote indication of all fans.

During the past 15 yr the Vesta-Shannopin properties expanded rapidly, and more fans and substations were installed to serve the larger areas. Because of steadily increasing labor costs, J & L gradually shortcomings in the various small sys- replaced manned stations with remotely controlled rectifiers. Since adequate control always was established at the time, J & L never investigated a standard system until the present scanning system was selected. The company had, however, tried various circuits for controlling the stations. These early controls were tried on a small scale, with never more than two stations on the same system and were designed to meet immediate needs.

Management recognized faults and tems developed by the company. Consequently, the company took steps to install a central control sys-



THESE widely scattered units at Vesta No. 5 mine are linked to the central circuit-scannig system.



INSPECTING central panel is W. G. Kegel, general master mechanic. Eight rectifiers, four fans and two pumps are monitored or controlled from the central station.

PROBLEM of monitoring and controlling outlying substations, fans and pumps is solved with central scanning system. System operates on low-voltage direct current.

Monitors and Controls Outlying Units

tem for all fans and substations. After careful consideration of needs, management decided to install a Femco 709 circuit-scanning system for the following reasons:

1. It closely simulates the old reliable methods of two-wire direct voltage operation of any control or indication.

2. Its circuits are more readily understood by J & L employees.

3. The low-voltage DC does not interfere with any other control.

4. Since it is an ungrounded system, two ground faults are necessary before operation of the unit is affected. Vesta No. 5 is located in a valley that is subject to severe electrical storms. The "ungrounded" feature is of special value for this reason.

The Vesta No. 5 main portal is at Donahoo shaft and the control station at this location is considered the center of all operations and controls. The station is manned at all times by lamphouse attendants who have sufficient regular work to justify the full-time schedule. Eight rectifiers, four fans and two pumps are monitored or controlled from the central station.

The man on duty does not leave the main control station when trouble develops at any other station, but calls for an attendant from the general machine shop to go to the unit in trouble. The shop man who goes to the unit is trained to make minor adjustments only. In case of a fan-signal failure, for example, he is required only to stay with the unit until the trouble is corrected by other more-experienced repairmen called by the Donahoo attendant.

What the System Is

Basically the system is an electrical one using relays and is, therefore, better understood by a man who has serviced various types of mining-machine controllers and particularly substation equipment. It uses plug-in relays which are easy to install.

The scanning system requires two wires which contact every station, as on a party-line telephone system. The type of wire varies with each installation. For example, a "telephone pair" within a multiconductor cable would do for short distances if such circuits were available. At Vesta No. 5 all equipment being controlled is on the surface. The signal line is strung on the power company's poles. No. 6 bare copper or aluminum is used for mechanical reasons rather than electrical capacity.

How the Scanner Works

Direct-pulse DC current is used to operate any control function or send back the appropriate signal to the main station. The control pulse travels from the office or main station to all field units and is approximately 175 V DC. Indication impulses originate at the field units and go back to the main station at 140 V.

The heart of the scanner is an unusual rotary switch. A synchronous motor drives an arm which has a magnet attached to its outer end. As this magnet rotates, it passes hermetically sealed reed switches mounted on the circumference of a circle. Each unit contains one of these function scanners and each is synchronized with the others. This feature permits a particular reed switch on each scanner to be closed at the same time. It is this feature that creates a direct circuit to each station for a short period at a given time. Through the rotary action of the magnetic arm these circuits are continually repeated. In sequence, each station is momentarily connected through the main station, and during this period control or indication for that station is possible. This system is further enhanced by its

ability to automatically open all power breakers in event of a fan failure. The time before shutdown is adjustable up to 30 min.

The station function scanners rotate at 30 rpm. They are supervised by a program scanner rotating a ½ rpm. The program scanner, located at the main office, contains as many reed switches as there are units to be controlled. The Vesta system has 18 reed switches, nine now in use.

The main function scanner, also at the main office unit, contains a reed switch for each function of every station unit. But each field unit uses only as many reed switches on its function scanner as are needed to perform its individual task. These appear at different points on the periphery of each field scanner.

During the period each reed switch in the program scanner is closed the main function scanner makes two complete revolutions, momentarily closing each of its reed switches as the rotating arm goes by. As the switches on the main scanner close, corresponding switches on the various field units close. Thus there is created an electrical link between field stations and the main station for each revolution.

Each field unit contains a timing relay which can be set to stay in for as long as 30 min after receiving a pulse current. Under normal conditions the timer receives its pulse every 2 min which keeps its contacts closed and thereby maintains operation of the equipment it controls.

For automatic shutdown of controlled equipment it is necessary to stop the impulse to the field units. If this is done, the controlled equipment at each station will be dropped off the line when the timers drop out. The utilization of this circuit makes possible the automatic removal of all power from a mine in case of a fan failure.

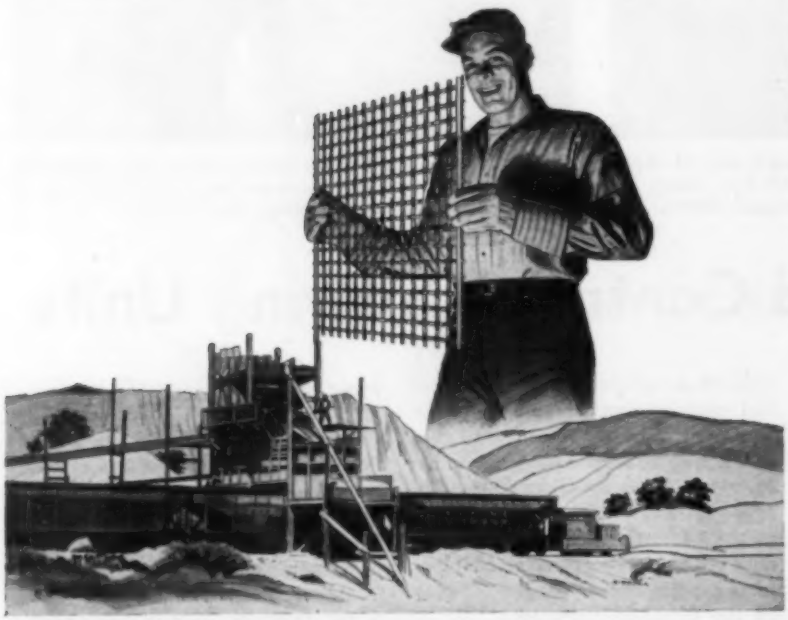
Although indications from each field station are automatically received once each 2 min, any station can be manually checked or controlled at any time by simply bypassing the program scanner.

Equipment

The office equipment, which is installed in the Vesta No. 5 lamphouse, consists of control switches; signal lights and alarms on the front of the cabinet; and control panel. The program scanner and main function scanner, and power supply; synchronizing circuits; indication, interlock and alarm relays are mounted in the cabinet and on the back of the panels. The office unit is factory-wired as a complete package. The only external connections required are for power, line pair and alarm.

Field equipment consists of a function scanner, power supply, synchronizing circuit, control relays and associated interlock circuits. All equipments in on three panels designed for 19-in rack mounting. Mounting these panels and running the wires is the only installation required.

The system has been in operation for almost a year and has been very satisfactory. This spring it was exposed to some particularly vicious electrical storms and performed without fail. It has given J & L positive control of the remote stations, which in emergencies is very gratifying to management.



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reduce cost by cutting downtime

This Image—the CF&I giant steelman—reflects CF&I's experience and versatility as a primary producer of quality steels and hundreds of steel products for industrial use. And the CF&I Image is your assurance of durable, accurate space screens.

Because CF&I Space Screens are designed to give long service life, you have fewer work stoppages due to screen failures, and your cost-per-ton screened is reduced. The types of wire, weave, crimp and edge preparation are chosen to give maximum performance under specific job conditions. Included in the types of screens available are Super Tempered Screens, made from a special oil-quenched wire, and Wisscoloy Screens, made from a special alloy steel wire. The wire in each screen is crimped to close tolerances for accurate spacing, and woven extra tightly on heavy-duty hydraulic looms so that spacing remains uniform during use.

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CF&I SPACE SCREENS

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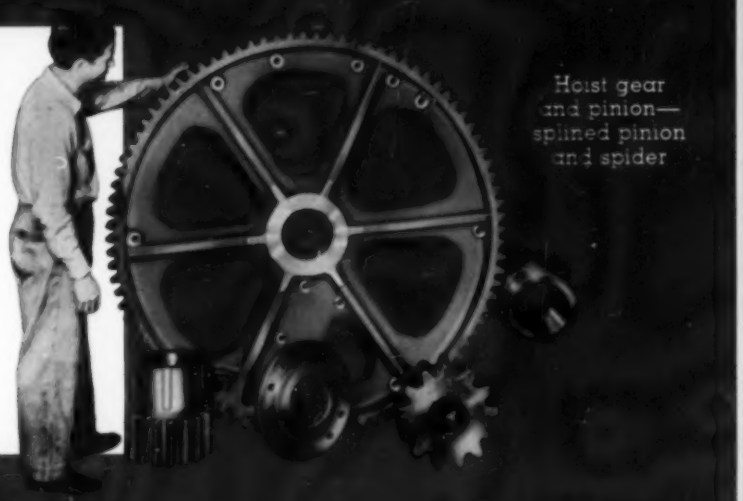
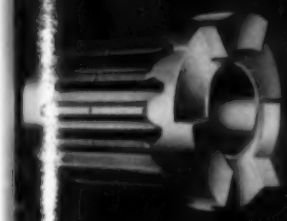
take a good look at these TSP hardened products



Hoist gear and pinion—splined pinion and spider

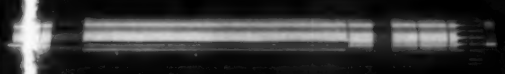


Walking pinions

Vertical swing gears

Spur gears and shaft pinions

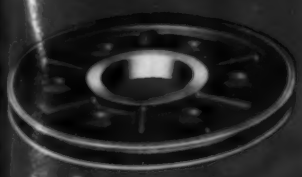
Double staggered tooth continuous miner sprocket



Continuous miner shaft

Continuous miner splined shaft

Bevel gears and pinions



Sheave wheels and pins

Splined bore continuous miner sprocket

Cab rollers

Conveyor rolls

Cat drive clutches

Continuous miner sprocket tube and hub assembly

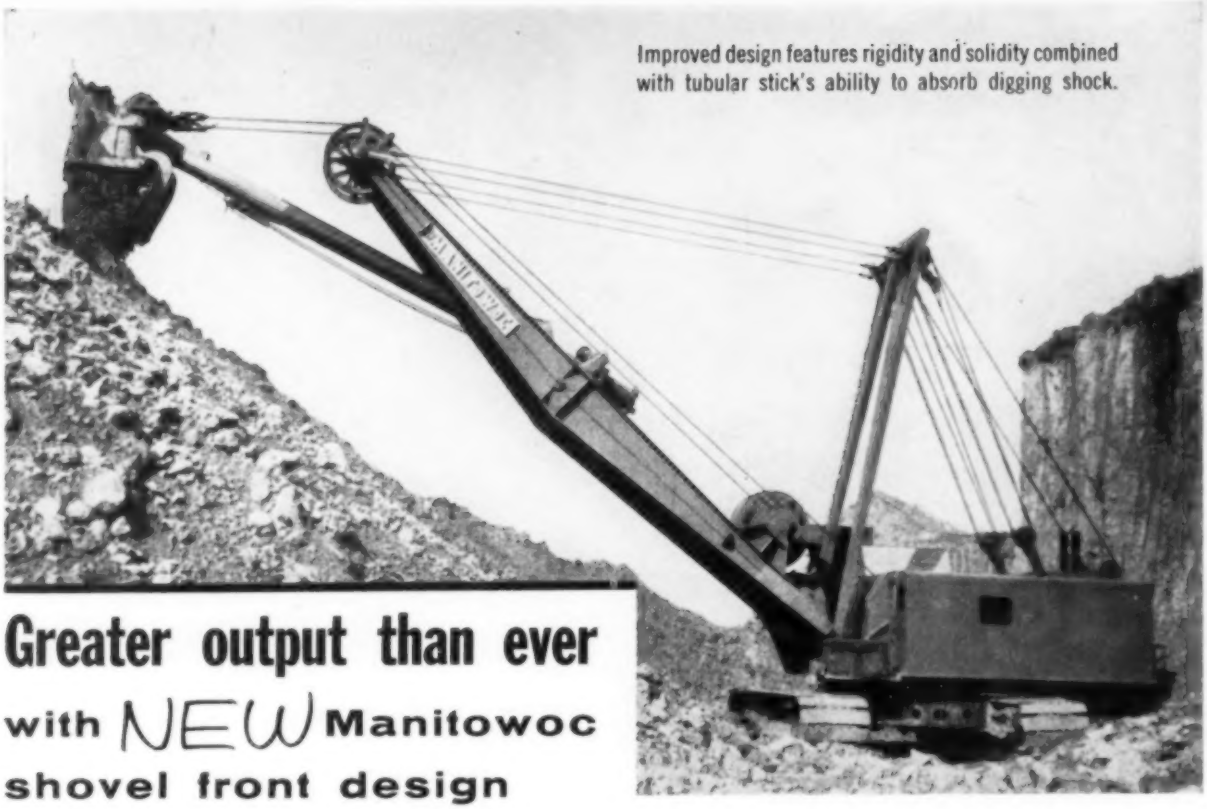
Illustrated here are a few of the hundreds of "Tool Steel Process" products especially designed and made for the rugged service requirements of the mining industry, both underground and strip. In serving the entire mining industry, The Tool Steel Gear & Pinion Co. has saved thousands of dollars in replacement costs alone, for each of the companies using TSP hardened products. TSP products are hardened by our special process. The file hard surface to full depth of permissible wear gives maximum life. The core, refined for toughness and ductility, gives maximum strength. The result is TSP products last many times longer than ordinary products. Our famous written guarantee goes with all TSP products. A copy of this written guarantee will be sent to you free upon request.

THE TOOL STEEL GEAR AND PINION CO.

MEMBER OF AGMA

CINCINNATI 16, OHIO, U.S.A.

The Standard of Quality Since 1909 for Gears, Pinions, Rolls, Wheels and Other Hardened Products



Improved design features rigidity and solidity combined with tubular stick's ability to absorb digging shock.

Greater output than ever

with NEW Manitowoc shovel front design

- *Better digging action*
- *Direct hoist power*
- *Absorbs impact shock*
- *50% less cable wear*

Now the powerful Manitowoc Model 4500 5½-yd. shovel combines an improved method of dipper suspension and direct application of hoist power to give you faster and better digging action . . . increased production . . . longer machine life.

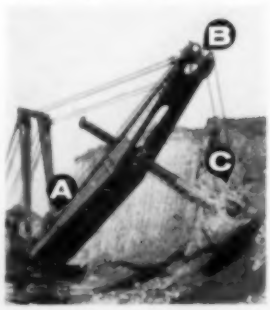
DIRECT HOIST POWER. Two short cables, powered by a double-drum spool mounted on the boom base, are separately reeved through each boom point sheave and are attached directly to swivel sockets at the outside corners of the dipper bail. Power transmission is simple and direct, eliminating long cables and frequent sharp bends. Cuts your maintenance costs and down time.

STABLE DIPPER SUSPENSION. With hoist cables attached to each side of the bail, and the bail block eliminated, you get widespread support of the dipper, added rigidity and stability in tough digging . . . yet you retain the shock absorbing features, resiliency and flexibility that tubular dipper stick design provides. You can still handle a rock too big to go through the dipper—simply lift it to the top of the spoil pile and as soon as you put slack in the hoist cables, the dipper will turn sideways and "spill" the rock.

In addition, you get better bucket penetration and loading with less spillage because all linkages are in line, and the bucket is more stable in every phase of the crowd, hoist and swing cycles.

To get complete information on the all-new Manitowoc shovel front end design, ask your distributor for a copy of Form No. 23-58 or write to Manitowoc Engineering Corp. for full details.

Here's How It Works: Hoist power is transmitted by heavy cable from the shovel main front drum over the center of a large "Secondary" hoist drum (**A**) mounted at the base of the boom. Cables are rigged from each of the spools on the secondary hoist over the boom point sheaves (**B**) and tied directly to heavy duty swivel sockets on each side of the bail (**C**). The hoist power flow is direct and simple, without sharp cable bends.



Manitowoc

MANITOWOC ENGINEERING CORP.

(A subsidiary of The Manitowoc Company, Inc.)

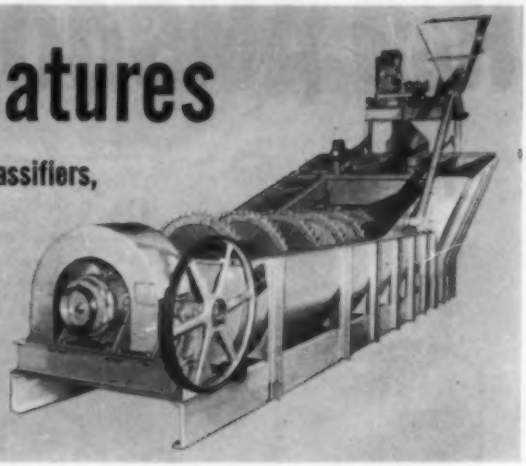
MANITOWOC, WIS.

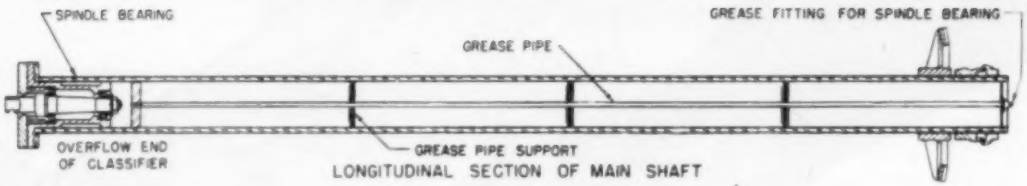
SHOVELS 1¼-yd. — 5½-yd. DRAGLINES 1¼-yd. — 6-yd. CRANES 25-ton — 100-ton

Exclusive Akins Features

which assure low-cost, trouble-free operation of classifiers, heavy media separators and densifiers

50 years of experience in the design, manufacture, and operating performance of spiral classifiers, heavy media separators and densifiers, has proven the importance of the exclusive mechanical features of the Akins machines... importance in terms of metallurgy, and in the economy of long, trouble-free operating life with minimum maintenance.





LONGITUDINAL SECTION OF MAIN SHAFT

SUBMERGED BEARING

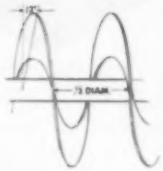
The patented submerged bearing has proven its advantages of durability, trouble-free operation, and ease of maintenance.

LUBRICATION

The submerged bearing is grease-gun lubricated through a pipe in the main shaft; thus the pipe is isolated from tank contents and protected against breakage. Grease fitting is at upper end of shaft for maximum convenience.

MECHANICAL LIFTING MECHANISM

The lifting device consists of chains, chain sprocket sheaves, and motor-driven or hand-operated reducer unit. Experience has proven this mechanical arrangement to be the most positive, with no possibility of slippage. Minimum maintenance. No packing glands or rods to become worn.

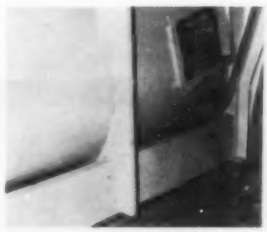


SPIRAL PITCH

50 years of experience has shown that the half-diameter pitch gives maximum raking capacity and results in less slippage and less wear than advanced pitch spirals.

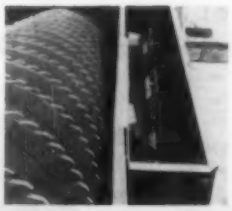
TANK SUPPORTS

Web beam substructure supports tank. There's no load to be carried by tank. This also reduces installation cost by eliminating need for extra sub-structures to support tank.



WEARING SHOES

Wearing shoes are made of various alloys, including Climax 42-A. Patented serrated wearing shoes are available for special applications. Special inner shoes are provided for heavy rake loads.



DRIVE

The bevel gear, V-belt drive has proven to be the most trouble-free and flexible. It permits mounting the motor, or motor-reducer, horizontally, and changing speeds quickly and inexpensively, by simply changing V-belt sheave ratio.

OVERFLOW BOX

An overflow box, with a pipe connection, is furnished as standard... requires only a single connection.

For complete information on Akins machines write for catalogs.

Manufacturing Division

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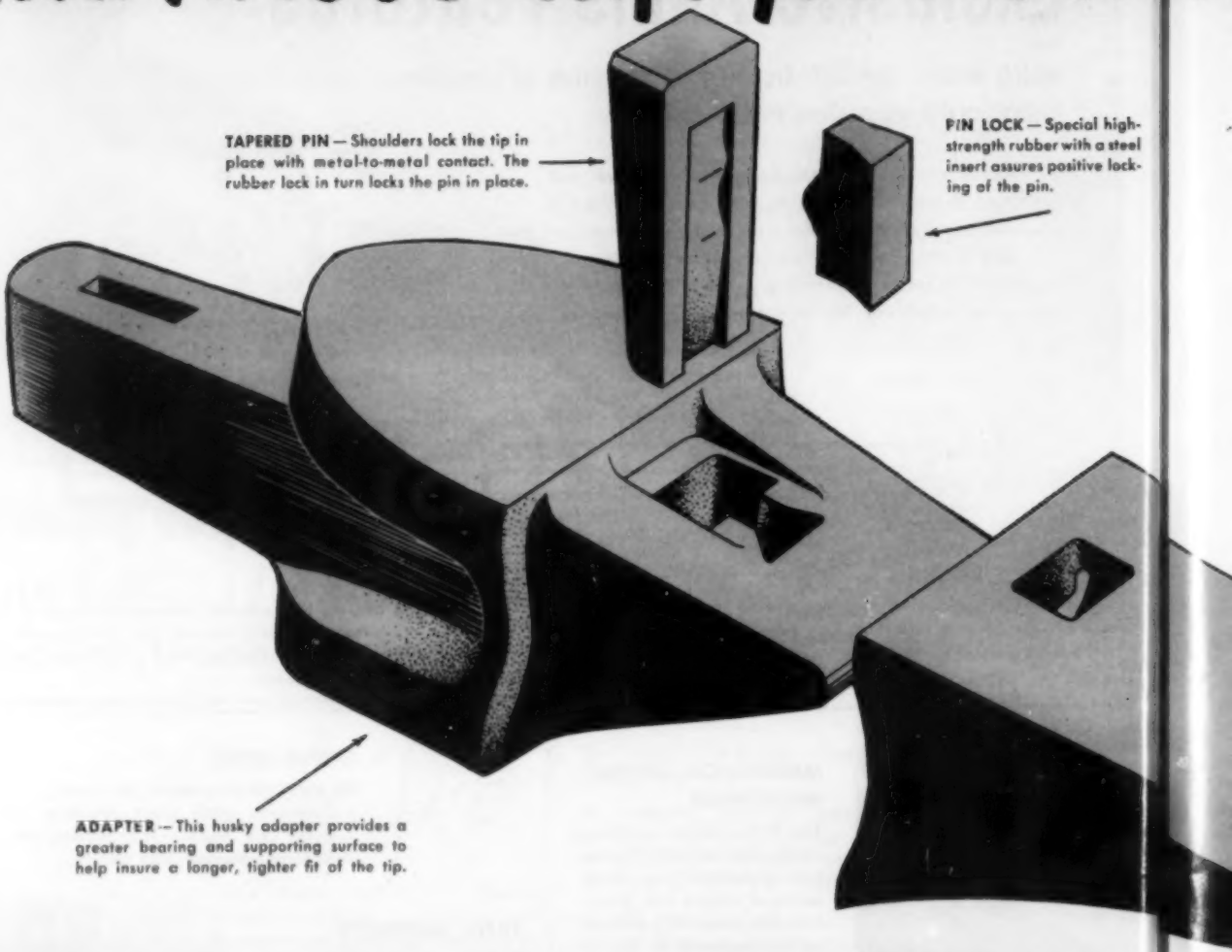
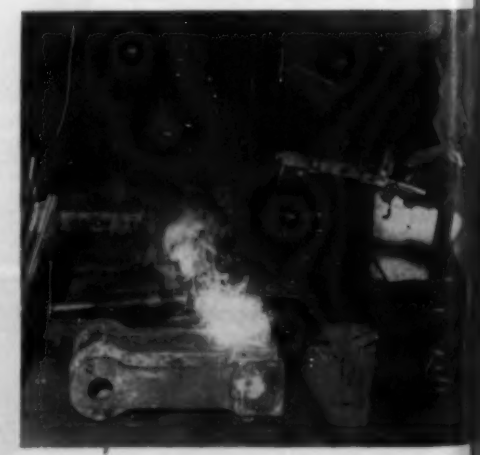
How AMSCO helps you MOVE M


TAPERED PIN — Shoulders lock the tip in place with metal-to-metal contact. The rubber lock in turn locks the pin in place.
PIN LOCK — Special high-strength rubber with a steel insert assures positive locking of the pin.
ADAPTER — This husky adapter provides a greater bearing and supporting surface to help insure a longer, tighter fit of the tip.

UNBEATABLE TEAM!

AMSCO CAST MANGANESE STEEL DIPPERS

Installed as original equipment on many leading makes of power shovels. Cast of manganese steel—"the toughest steel known"—a material which provides as much as a ten-to-one advantage in lasting power over other steels, under the abuse of severe impact and abrasion. Sizes from ¾ cu. yd. to 9 cu. yd. capacity. See your power shovel distributor, or write us for booklet . . . "Amsco Manganese Steel Power Shovel Equipment".

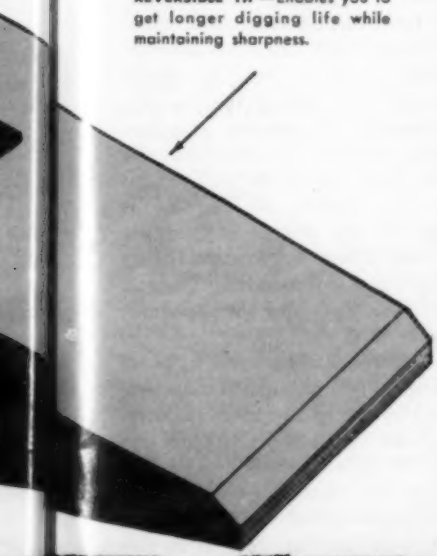


E MORE TONS PER DOLLAR

AMSCO Simplex 2-Part Reversible Dipper Tooth

- **EXTENDS DIGGING LIFE**
- **STAYS SHARP**
- **EASY TO REPLACE**

REVERSIBLE TIP—Enables you to get longer digging life while maintaining sharpness.



Now you can save hours of costly shovel downtime . . . by using this new Amsco Simplex 2-Part Tooth.

Simplex tips are quickly reversible to give added tip life while retaining sharpness. And when teeth eventually become worn, just knock out the retaining pin and replace with a new tip.

Simplex adapters fit this new 2-part tooth to *any* Amsco dipper or backhoe. And because Amsco makes both dippers and dipper teeth, you can be sure of proper fit between the adapter and shovel lips.

Cast of a new alloy especially developed for this service, the Amsco Simplex design is backed by over 50 years of experience in producing dippers and dipper teeth for the most rugged digging conditions.

Ask your power shovel distributor to supply you with these extra-long-wearing Simplex 2-part teeth . . . now!

Write us for complete descriptive bulletin on Amsco Simplex teeth, giving information on sizes and types available.

AMSCO HARDFACING FOR BUILD-UP AND REPAIR

Add extra service life at low cost to dippers, dipper teeth, hammers, augers, etc. . . . with Amsco Hardfacing. Complete line of hardfacing electrodes available through your Amsco welding distributor. Or write us for condensed catalog and price list on "Amsco Hardfacing Alloys".

AMERICAN Brake Shoe COMPANY

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Welding products distributed by Canadian Liquid Air Co., Ltd.

Coal Research and Techniques In Communist China

An expert on Far-Eastern affairs reports on education and research, methods and productivity, in the coal industry of Red China.

By **K. P. Wang**, Far East Specialist
Division of Foreign Activities
U. S. Bureau of Mines, Washington, D. C.

BASIC DATA on coal developments in Communist China can be assembled from Chinese and Russian literature, the language barrier being the main deterrent to their usefulness. Much of the literature can be seen in the Library of Congress, the Bureau of Mines, and other federal agencies and a few private research organizations. This short review on coal research and techniques in Communist China is based upon only a cursory examination of available information. The intention is to touch the highlights on developments so as to enable interested parties to study the problems more thoroughly. The most important sources referred to include the following periodicals:

Mei-t'an Kung-yeh (Coal Industry); bimonthly, covering all phases of coal production and utilization.

Mei-k'uang Chi-shu (Coal Mining Techniques); monthly, about to be changed to bimonthly; dealing with the subjects implied by its title.

Shih-yu Lien-chieh (Petroleum Refining); monthly, including oil from coal and shale.

Jan-liao Hsüeh-pao (Fuels Journal); quarterly on fuel technology and coal utilization, including Fischer-Tropsch synthesis and hydrogenation.

Shih-yu Kung-yeh T'ung-shün (Petroleum Industry News); this periodical carries information on oil and gas from coal.

Kang-t'ieh (Iron and Steel); this periodical deals occasionally with carbonization and coal-gas utilization.

General Aspects of the Coal Industry

The radical expansion of coal production in Communist China during the last few years has stimulated intense research in mining techniques and the utilization of coal. Resources have long been considered rich. As a result of the intensive exploration program undertaken by the Chinese Communists since they assumed power in 1949 and new information uncovered by as many as 20 million people simultaneously digging coal after the commune movement got underway in late 1958, coal reserves reportedly have been raised many times, to the latest claim of about 9.6 trillion metric tons. (Standards used for making reserve estimates undoubtedly are quite different from those used in the United States). Few countries of the world have claimed such extensive reserves. About four-fifths bituminous, coal is found in almost every province; even the southern half of the country, formerly thought to be relatively barren, is now considered to have fairly large reserves. The coal beds are quite regular, usually thick, often close to the surface, and relatively easy to work. The quality of the coal is moderately good, although its ash content is generally higher than that of U.S. coal. There is abundant coking coal. Transport is no longer a major handicap because many new routes have been opened and the numerous local industries have been created.

Expansion of the coal industry is considered to be of utmost importance to the country's industrialization program along with the development of the steel industry. The highest output figure claimed by the Chinese Communists for 1958 is about 270 million metric tons of run-of-the-mine coal. This may be somewhat exaggerated, but component data in many technical reports substantiate generally the output claims for that year. A further increase is likely in the near future so that by 1959 the country undoubtedly will rank third among world coal producers after the U.S.S.R. and the United States, although its per capita output is much lower. The Chinese Communists coal production goal for 1959 has been reported at 335 million metric tons. About 56% of the 1958 output came from efficiently operated large-scale mines, and the rest from small operations worked by communes and local groups. While the large mines made substantial progress in 1958, it is the numerous newly-formed small operations which together furnished a large part of the increase in overall output. The two basic objectives of the Chinese Communists in 1959 are to accelerate the development of large coal mines and consolidate and streamline the small mines.

Red China's Biggest Mines

The principal coal mines and mining administrations in Communist China, most having their own production-techniques offices and many affiliated with basic construction bureaus and research and design institutes, are listed below with data on their production levels:

Dr. Wang is author of "Controlling Factors in the Future Development of the Chinese Coal Industry," King's Crown Press, Columbia University; 1947.

Mine or mining administration	Province	Reported 1958 output	Proposed 1959 goal
		(Million metric tons of run-of-mine coal)	
Fushun	Liaoning	15.2	21.0
Fuhsin	Liaoning	13.6	21.0
Kailan	Hopei	12.7	16.5
Tatung	Shansi	9.2	11.0
Chihsi	Kirin	8.7	13.5
Huainan	Anhui	8.2	14.0
Hokang	Heilungkiang	8.0	13.5
Fengfeng	Hopei	est 6.0	9.0
Tzupo	Shantung	5.9	8.7
Yangchüen	Shansi	est 5.2	n a
Chinghsi	Hopei	4.1	7.0
Chiaotzo	Honan	4.1	6.3
Hsishan	Shansi	4.0	n a
Chaochuang	Shantung	est 4.0	est 8.0
Chiawang	Kiangsu	est 3.0	n a
Chiaoho	Kirin	est 3.0	n a
Shuangyashan	Heilungkiang	2.3	n a
Peipiao	Liaoning	2.3	4.8
Fengcheng[1]	Kiangsi	n a[2]	2.5
Nanpiao[1]	Liaoning	n a	3.5
Chienho[1]	Honan	n a	est 2.0

Other coal mines which probably produced 1–3 million tons during 1958 include Pinghsiang in Kiangsi, Penhsihu (Penchi) in Liaoning, Chinghsing in Hopei, Tungchuan in Shensi, and Hsian in Liaoning.

[1] Very new mines.

[2] Not available.

Although Chinese coal eventually may become important in world trade, it will be consumed primarily in the domestic market for some time to come. The coal produced in Communist China is used not only for coke and cement manufacture, household purposes, power generation, railway fuel and general industrial use, but also, to a limited extent, as a raw material for the extraction of liquid fuels. Because of the shortage of petroleum, utilization of coal to make oil is expected to be of growing significance.

The Chinese Communists are extremely conscious of costs, productivity, and quality, and the general level of both mining practice and management has been greatly improved in recent years. Overall productivity in large mines is now about 1.5 metric tons per man shift, and the best record for a single mechanized working face is about 15 tons. Productivity comparisons should not include the coal produced by the masses, because of the sporadic and somewhat seasonal nature of the operations.

Much work has been done in building new shafts, improving ventilation and transport, mechanization of extraction, and preparation and utilization of coal. Most mining equipment used in coal production can now be manufactured domestically. The general technological level of the coal industry compares favorably with that of most industrialized countries, recognizing the fact that operational factors are different because of the relatively cheaper manpower in Communist China. As an example of the technical accomplishments, it can be said that the Chinese are having great success with the Soviet combines (similar to the U.S. continuous miner) in cutting and loading coal. Great emphasis has been put on hydraulic coal mining, and the Chinese Communists hope that by the end of 1962 an important part of the coal will be produced in this manner.

Mining Education and Information

To give technical support to the coal industry, the Chinese Communists have established a number of new mining colleges, many secondary technical schools, and about a dozen design and research institutes, and have strengthened the production techniques offices of all of the large coal mines and plants. Much money and effort have been put into education, social welfare, and research. Many technical meetings have been called on both local and national levels. Students and research workers are often sent to the field and selected workmen are given advanced training in the schools and institutes. Thus, ideas on technological improvements come from both the technical staff and the workmen. Technical publications on coal and related fuels reveal that Communist China must be reckoned with in many fields of coal technology. Some of the best work is done in coal classification, shaft sinking, and hydraulic mining. Useful experiments are also done in coal preparation, carbonization, and liquefaction. Certain processes related to small-scale coking plants and coal-to-oil distillation and synthesis units, applicable to conditions in Communist China, are of scientific interest.

The leading organizations in Communist China currently engaged in coal research, mine and plant design, and coal technology education are shown below:

Research and design institutes:

"Chinese Academy of Science (or Academia Sinica) Coal Research Institute," Peiping.
"Chinese Academy of Science Petroleum Research Institute," Peiping.
Tangshan Coal Technology Institute, Tangshan, Hopei.
Fushun Coal Technology Research Institute, Fushun, Liaoning.
Fushun Petroleum Research Institute, Fushun, Liaoning.
"Pei-ching Coal Preparation Institute," Peiping.
"Pei-ching Refining and Extraction Research Institute," Peiping.
"Pei-ching Coal Mine Design Institute," Peiping.
Tangshan Coal Mine Design Institute, Tangshan, Hopei.
Hsian Coal Mine Design Institute, Hsian, Liaoning.
Shenyang Coal Mine Design Institute, Shenyang (Mukden), Liaoning.
Wuhan Coal Mine Design Institute, Wuhan, Hopei.
Shanghai Coal Mine Design Institute, Shanghai.
Chungking Coal Mine Design Institute, Chungking, Szechuan.
Changsha Mining Technology Research Institute, Changsha, Kiangsi.

Educational institutions:

Peiyang University (may have been reorganized), Tientsin, Hopei.
Tangshan Chiaotung University (may have been reorganized), Tangshan, Hopei.
"Pei-ching Mining College," Peiping.
Tungpei Engineering College, Shenyang (Mukden), Liaoning.
Hofei Mining Industry College, Hofei, Anhui.
Huainan Coal Mining School, Huainan, Anhui.
Tatung Coal Mining School, Tatung, Shansi.
Chihsi Coal Mining School, Chihsi, Liaoning.
"Pei-ching Coal Technology College," Peiping.
"Pei-ching Petroleum College," Peiping.
"China Coal Mining College," Peiping (?)
Sian School of Mining, Sian, Shansi (?)
Chungnan Mining and Metallurgical College, Wuhan, Hopei.

Nature of Coal Research

Before 1949 little work on any phase of coal research had been done in the country, due to chaotic wartime conditions. Since then, however, an increasing amount of investigation in coal extraction, preparation, and utilization has taken place. Until 1956 the Chinese were

busy learning established methods as witnessed by the many foreign articles translated and papers presented by Soviet technologists in coal literature. Beginning in 1957 studies on improving known techniques as applied to Chinese conditions began to appear; a year later, a fair amount of original work on new techniques was noted. As a result of the radical expansion of the coal industry in the "leap forward" year of 1958, the Chinese Communists have stated that 1959 is to be the year of consolidation and making technical improvements. Therefore, considerable new information on coal technology is expected in 1959 and the years to follow. Only part of the investigation is carried on by research organizations, the rest being performed through pilot plants and field testing. While the emphasis of the research work is on large-scale mine plants, there has been a recent drive to improve techniques related to small-scale operations. The latter phase of the activities should be of particular interest to underdeveloped countries with similar resource problems.

Because many new mines have been developed or are in the process of development, shaft sinking and tunnel ing techniques were emphasized. In addition to applying standard practices, special sinking methods such as freezing, drop-shaft, and sheet-piling were tested and in some cases adopted. Valuable experience has been gained in shaft sinking and tunneling in soft ground, gassy areas, and excessive water zones. The use of prestressed reinforced concrete has been studied. In shaft sinking and constructing arched tunnels around shaft areas, spraying of concrete mixture by compressed air has been successfully applied.

Shafts Without Headframes

An interesting technique developed in shaft sinking is the "no headframe method." In this method, the top part of the shaft is used to brace the equipment needed for sinking the vertical shaft and later house the hoist. If the shaft is on a hillside a main haulage drift is driven, and if the shaft is on level ground a gentle incline is simultaneously driven to intersect the shaft for hauling coal and serving as manway and supply route.

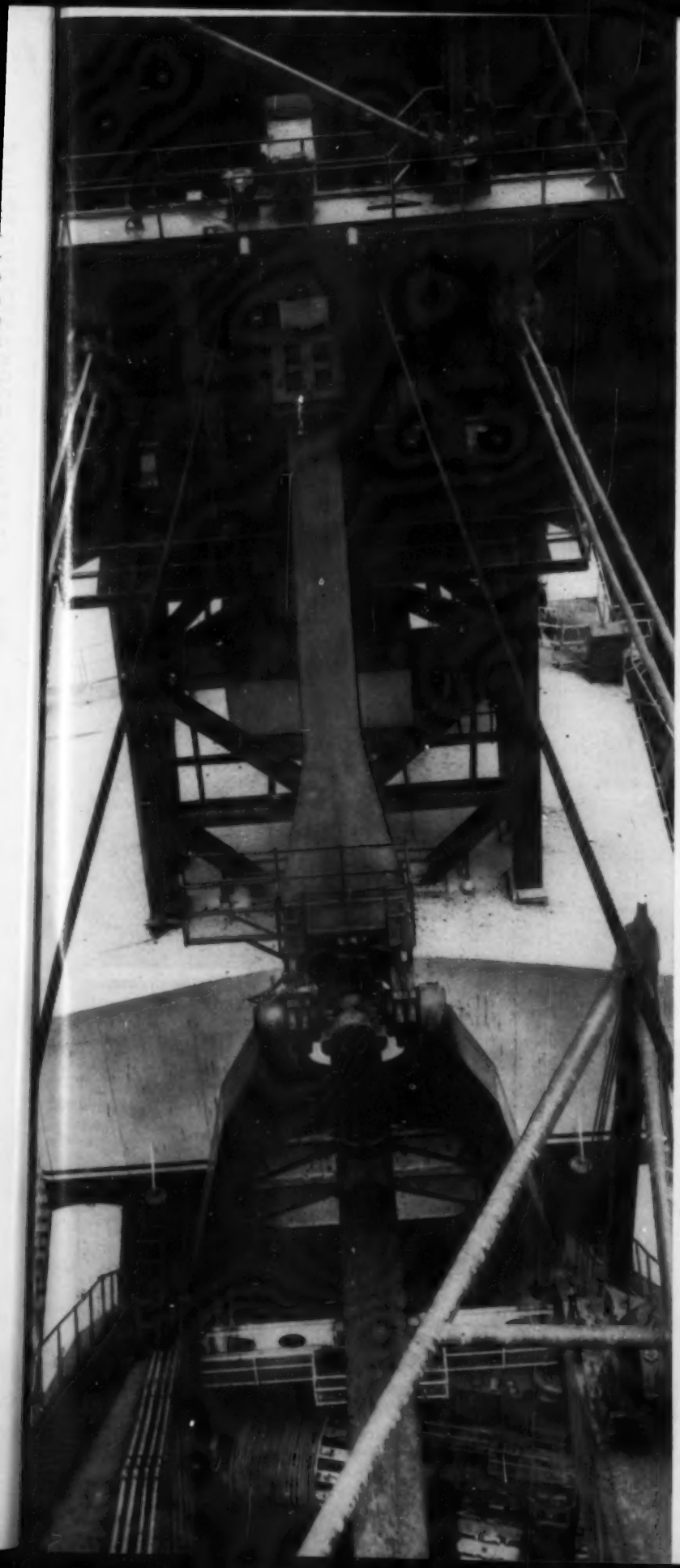
In the field of extraction the most recent emphasis is on hydraulic mining of coal. To increase efficiency of operations, a 300-meter lift coal-water pump was designed by the Tangshan Coal Technology Institute. To step up hydraulic coal mining in general, the "Pei-ching Coal Mine Design Institute" has completed a standard design for shaft mines with an annual capacity of 240,000 tons. An interesting study has been made on utilizing underground water to create some of the pressure required for hydraulic mining. Multicycle-combine (a type of continuous miner) cutting and loading operations is also a subject of great interest; by increasing the cycles, productivity is raised, costs are reduced, and less support is needed. Special studies on mining methods pertaining to thick, thin, and highly pitched beds have been made. Because mine timber is scarce, much work has been done on conserving wood, such as roof-pressure studies, use of roof bolts, and employing retrievable metal props in longwall mining. Sandfilling and longhole blasting have been introduced.

Attention has also been directed to basic services related to coal production. In ventilation, studies have been made on calculating oxygen consumption, air volume, and air loss indices. Pump design and performance are subjects of continuing interest. Mine transport and hoisting practices are being improved, particularly in small-scale operations where there is a concerted effort to introduce ball bearings, mine cars, and efficient native-style hoisting equipment. Experiments are conducted in core drilling and subsidence. There is a bureau to promote mine safety. As examples of work done in mechanical and electrical equipment, investigations have been made in increasing the cutting height of the Soviet Donbass No. 1 combine, minimizing breakage of gears in hoisting drums, preventing 3-phase electric motors from working single phase, and designing roof pressure measuring instruments.

Basic studies are being made on the physical and chemical properties of coals from various fields, as well as their preparation and utilization characteristics. Specific investigations deal with moisture and ash fusion properties. Much new work has been accomplished in the classification of Chinese coals. In order to reduce coal and coke consumption in iron smelting and provide suitable raw material for making coal products, the preparation and blending of coal have been emphasized. Heavy-media separation and cleaning of fine coal are among subjects of current interest. Large coal preparation plants are designed by the "Pei-ching Coal Preparation Institute."

Carbonization of coal by low- and high-temperature methods is being investigated. Although large-scale methods pertaining to bituminous coal are of primary concern, the most interesting recent work relates to small-scale methods and nonbituminous coals. Many different kinds of native coking furnaces (some similar to beehive ovens and some much larger) are being designed and tested, including a variety of furnaces built around piles of coal to make a carbonized product (coke or semicoke) and byproduct oil and ammonia. Experiments have been made in utilizing anthracite to smelt iron ore and low-temperature-carbonization of brown coal to form semicoke, which can be briquetted with a little asphalt pitch and coking coal for high-temperature carbonization to produce coke. Research has been conducted on processing low-temperature char. The use of semicoke and char for domestic heating and railway fuel is also being investigated.

Special emphasis is being placed on the extraction and refining of oil from coal and shale, some work of this nature having been done by the Japanese in Manchuria during World War II. Design of suitable distillation furnaces is a subject of interest. Efforts are being made to recover more coal tar from native-style coking ovens. The Lurgi furnace is being studied for modifications so as to improve oil recovery. Research is being done on the processing of coal tar to form more light oils and make good-grade lubricating oils. The Chinese Communists have developed a suitable nitrided, fused iron catalyst for Fischer-Tropsch Synthesis and are searching for new catalysts. Studies are made on various byproducts of carbonization, distillation, and hydrogenation. The Fushun Petroleum Research Institute is designing a plant for processing 10,000 tons of bituminous coal tar per year by medium-pressure hydrogenation.



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Imagine yourself at the top of the boom of one of the world's largest shovels. You're 147 feet up—as high as a 14-story building. The only supports you have are the four 3⅛" Tiger Brand Boom Support Strands shown at the left and right of the picture. But don't worry, these strands have a total strength of 3,072 tons . . . and they are designed to resist vibration and shock.

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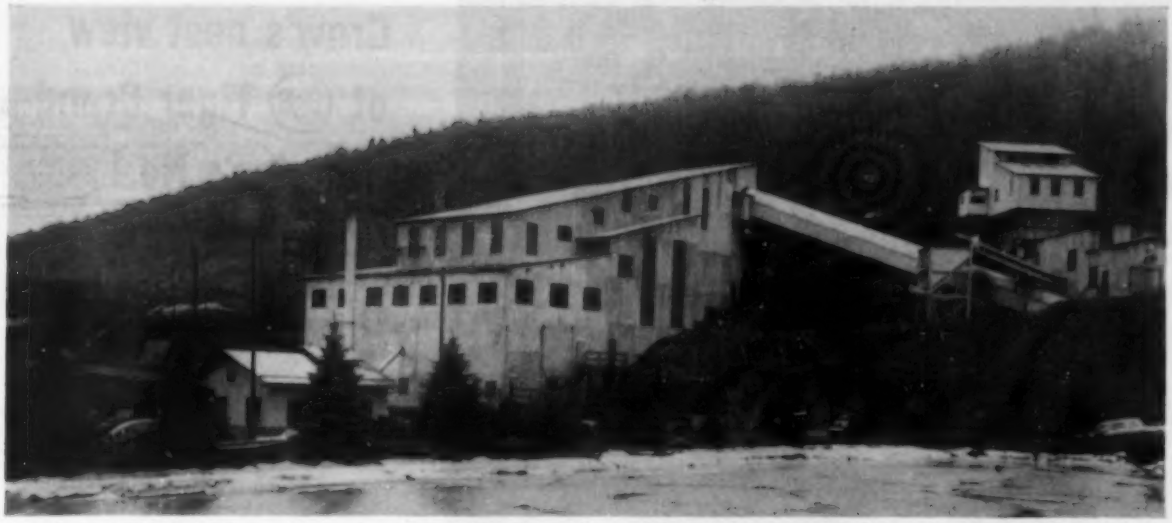
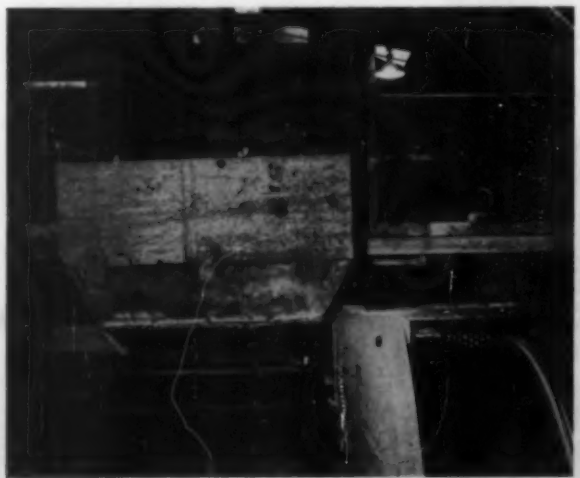


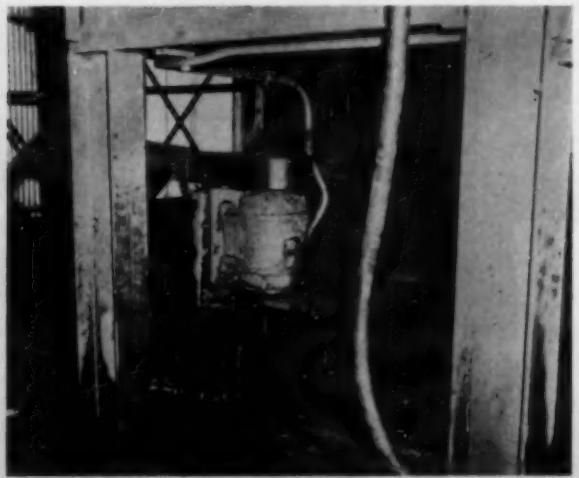
MODERN STRUCTURES and care in grounds-keeping mark new 225-tph heavy media plant of Kocher Coal Co. which processes anthracite from a number of small mines. Heavy-media separation at 1.75 sp gr uses ½ lb medium per ton of feed.

8X12-FT DRUM SEPARATOR in background discharges coal and refuse to drain and rinse screen and coal is sized on shakers at right foreground.

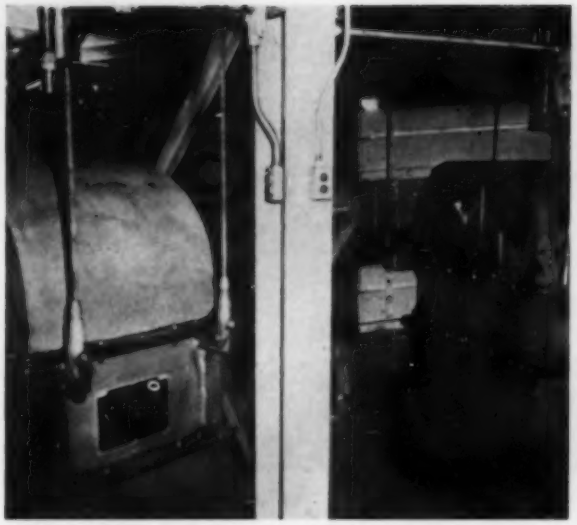
RUN-OF-MINE is fed to rough-cleaning plant for picking and crushing.



ROLL CRUSHER receives lump coal from picking table at upper level in roughing plant and feeds 36-in plant-feed belt.



MEDIA MAKEUP sump and pump are located at ground level to permit easier, cleaner handling of magnetite.



FINE COAL, minus 5/16 in, is washed on wet tables, including double-deck units for high capacity over minimum space.

CLEAN-COAL CRUSHER is adjusted by Fred Schwalm, plant foreman, in accordance with market demands.

Flexibility, Efficiency, Economy Mark Kocher Heavy-Media Plant

All anthracite operators are faced with the problem of producing a wide range of closely-specified sizes.

Kocher Coal Co. eliminates a lot of the strain through the use of modern equipment in flexible circuits.

A NEW 225-tph heavy-media plant to replace a burned-out anthracite washery was erected in a little over 3 mo in the summer of 1958 by men and officials of Kocher Coal Co., Valley View, Pa. Engineering services for the rebuilding job were provided by Western-Knapp Engineering Co., from the company's offices in New York.

The Kocher enterprise, headed by Leon E. Kocher, president, purchases raw coal produced by independent miners from anthracite deposits a few miles west of Pottsville, Pa. Products of the plant are transported chiefly by truck to local outlets and to markets along the Eastern Shore. Some Kocher coal has been shipped overseas in the past few years over the facilities of the Reading R. R.

Shortly before the fire in May, 1958, Mr. Kocher had installed a Wemco Mobil-Mill in the original plant. Concerning the fire, the story-in-a-nutshell is that the structure was totally destroyed before fire-fighting equipment could be assembled and brought to bear. However, the firefighters, at the request of Robert Rissinger, general manager of the coal company, had the foresight to play a stream of water on the drum of the Mobil-Mill. This prevented warping of the drum and its supporting structure, thus the nucleus of the new plant was preserved.

Cleanup chores were begun at once at the site and plans for a new structure were laid. The new plant, a striking example of modern design for anthracite preparation, began operations Sept. 4, 1958. It features all-steel framing and corrugated, galvanized-steel sheathing, a solidly constructed power-distribution system, a coal-preparation circuit equipped with an adjustable crusher, electric welding taps throughout the plant and streamlined magnetite handling and charging methods.

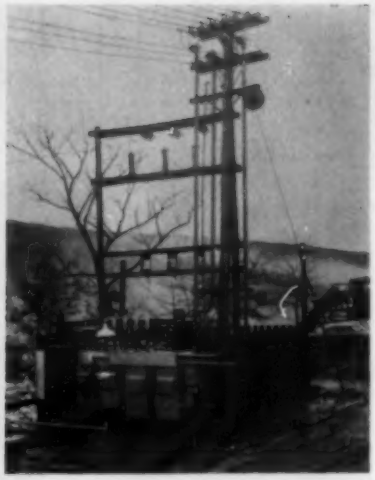
The surroundings of the plant are blacktopped to provide the best in traffic conditions for the company and customers. Earth dikes have been erected to form a reservoir of fresh water and a settling pond for clarification of process water and retention of solids. The slope of a hillside was utilized to gain full gravity flow during the coal-cleaning process, except for the conveyor which returns the product of the adjustable crusher to the head of the clean-coal shakers for rescreening.

Essentially, the cleaning process consists of rough cleaning to prepare a minus 4-in raw-coal feed for the washery, heavy-media cleaning of the 4x5/16 and tabling of the minus 5/16.

Handling Raw Coal

As shown in the accompanying flow diagram, the run-of-mine is dumped from the haulage trucks into a 70-ton hopper, and fed from there onto a 5x24-ft bull shaker and picking table. The plus 4-in oversize, discharged from the picking table, is

CONTROL CENTER for plant equipment is inspected by Robert Rissinger, general manager. All power distribution lines are encased in rigid steel conduit.



LAST WORD in safe, dependable electrical construction is a Kocher feature.

FREQUENT SAMPLING and lab analyses are made by Elmer Jenkins, coal inspector at Valley View.

WELDING CIRCUIT is carried to taps in plant. Welder carries only welding cable and electrode holder.

passed through a set of 34x36-in primary rolls for primary crushing. Minus 4-in material from the blank lower deck of the bull shaker is chuted directly to the plant-feed conveyor belt. Rock from the picking table is collected in a 30-ton rock pocket, from where it is hauled to disposal areas by the coal trucks.

Associated with the rough-cleaning facilities are a number of diversion circuits which add greatly to the total flexibility of the plant. These are related to the storage of coal at the plant in raw and washed-coal stockpiles to offset interruptions in raw-coal supply or plant operation.

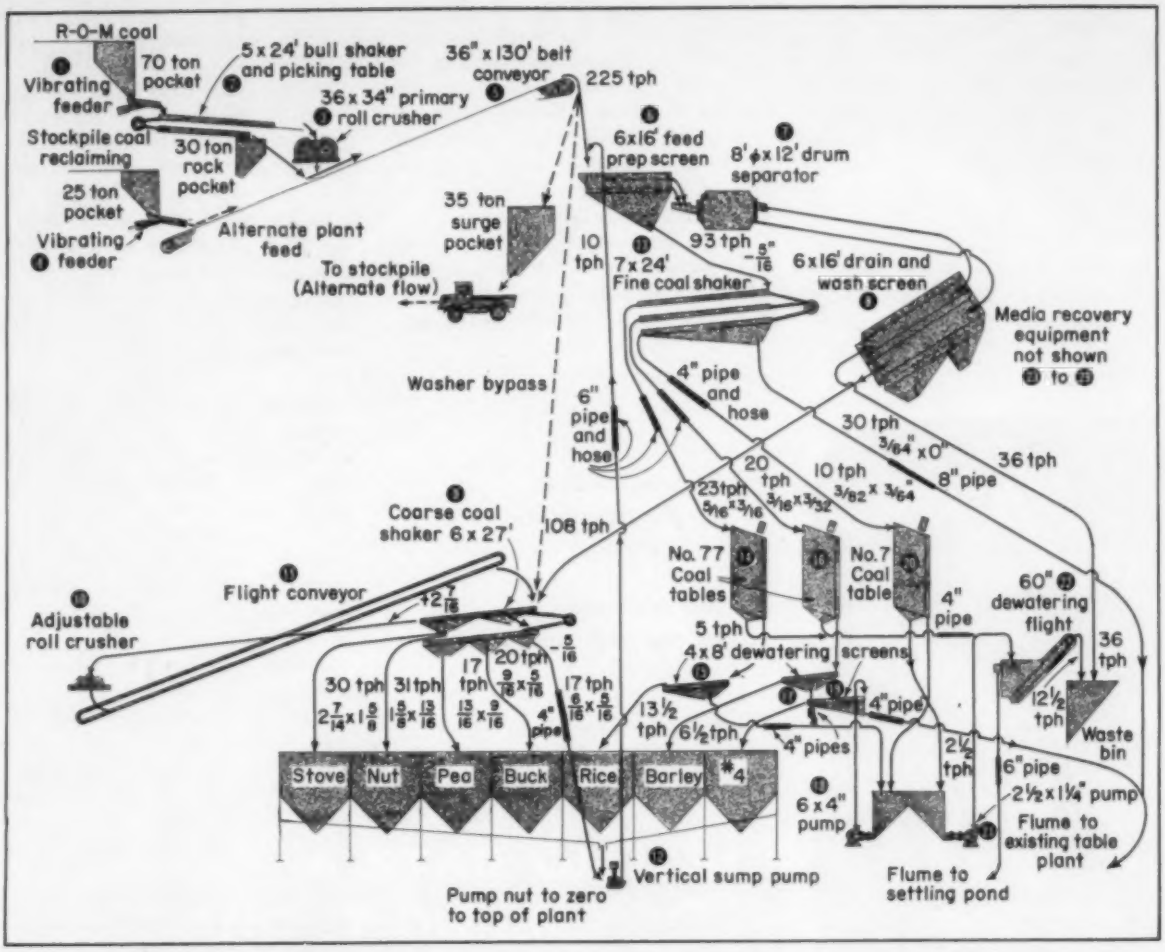
For example, washed coal can be trucked from the clean-coal pockets to the stockpiles, then returned as needed to a 25-ton reclaiming pocket and fed onto the plant feed conveyors. The flow of rough-cleaned coal is interrupted while this clean coal is on the conveyor. Inside the plant the reclaimed clean coal bypasses the washing equipment and goes directly to the final sizing shakers for resizing and storage in the pockets.

Rough-cleaned coal also can be stockpiled for later reclamation through another diversion circuit which leads to a 35-ton pocket, as shown. As a final hedge against running out of coal in periods of high demand, the company can stockpile run-of-mine coal on the property. Complete flexibility is achieved through the clean-coal crushing circuit. The major item in this is a Gundlach adjustable-roll crusher. The plus 2⅞-in oversize can be reduced to any smaller size and returned via flight conveyor to the head of the final-sizing shakers to increase the yield in any particular size at the expense of the oversize. A stockpile of Stove size provides the buffer.

Preparation Equipment

Item No.	Description	Horsepower
1.	Vibrating feeder	2
2.	Bull shaker and picking table	25
3.	Primary roll crusher	25
4.	Vibrating feeder	2
5.	Belt conveyor	20
6.	Feed preparation screen	20
7.	Drum separator	10
8.	Drain and rinse screen	10
9.	Coarse coal shaker	25
10.	Secondary roll crusher	30
11.	Flight conveyor	25
12.	Vertical sump pump	40
13.	Fine coal shaker	25
14.	Double-deck coal table (rice)	3
15.	Dewatering screen (rice)	2
16.	Double-deck coal table (barley)	3
17.	Dewatering screen (barley)	2
18.	6 × 4-in pump	10
19.	Dewatering screen (No. 4 coal)	2
20.	Single-deck coal table (No. 4 coal)	2
21.	2½ ×1¼-in pump	2
22.	Dewatering flight conveyor	5
23.	Media pump (5-in)	30
24.	Densifier (26-in. × 18-ft 10-in)	3
25.	Wash water pump (4-in)	15
26.	Magnetic separator (36 × 48-in)	13.7 (kva)
27.	Demagnetizing coil (6-in)	7.7 (kva)
28.	Booster pump (water)	20
29.	Sump pump	10
30.	Water pump	125
31.	Primer pump	5

Total connected equivalent horsepower—521.4



ECONOMICAL HANDLING of products and refuse are a major benefit derived from well-planned circuits.

Making Standard Anthracite

In normal operation the plant-feed conveyor discharges to a 6x16-ft Hewitt-Robins Eliptex feed-preparation vibrator. Overproducts of both decks of this unit are fed directly into the 8x12-ft drum of the Mobil-Mill. The minus 5/16-in underflow of the screen is sluiced to a triple-deck fine-coal shaker where the feed fractions for the washing tables are separated.

Clean-coal and refuse streams from the heavy-media drum separator are drained and rinsed free of magnetite on a 6-x16-ft partitioned Allis-Chalmers vibrating screen. The drained refuse is chuted directly to a waste hopper and clean coal to the final-sizing shakers.

The drum operates at a separating gravity of 1.75, and magnetite consumption is about 0.5 lb per ton of clean coal produced. Float-sink tests show less than 0.5% float in the refuse.

Efficiency in handling and charging magnetite into the circuit is one of the outstanding features of the new Kocher setup. A medium makeup sump is constructed beneath the floor at ground level of the plant. Automatic overhead doors at either side of the plant admit trucks hauling the medium into the plant where the bags of magnetite can be unloaded and stacked. In cold weather the doors can be closed while this operation takes place.

Charging of magnetite into the circuit also is done at this point. A bag of magnetite is opened and dumped into the adjacent feed aperture of the medium makeup sump. The medium makeup pump is a vertical unit located at this point.

The big advantages are that there is no need to raise the magnetite to any higher charging level and the ground floor can be washed down to remove any spillage of the medium. It adds up to easier, cleaner magnetite handling.

A typical analysis of the product of the plant, on a dry basis, is as follows:

Volatile matter	7.5%
Fixed carbon	83.4%
Ash	8.3%
Sulfur	0.8%
Heating Value	13,930 Btu per lb

The fine coal, in the minus 5/16-in range, is cleaned on three Deister washing tables in the new plant. Two of these are double-deck Model 77 units and one is a single-deck Model 7 Diagonal Deck table. The double-deck tables clean the Rice and Barley sizes and the single-deck unit produces Buckwheat No. 4, at the rates shown in the flowsheet. Sizes smaller than Buck No. 4 are cleaned

in a separate table plant which was a part of the original facilities.

Products of the tables are dewatered on 4x8-ft dewatering vibrators which were designed by Kocher Coal Co. officials and made by the company.

Maintenance Aids

Power is brought to the Kocher Coal Co. transformers at a potential of 23 KV. It is stepped down to 440 V to supply plant motors and later to 220 and 110 V for smaller motors and lighting circuits. All wiring is installed in rigid steel conduit, except for the droplines from substation to building. Weatherheads are provided at connection points of droplines to conduit lines to increase the dependability of the system.

Main disconnects are installed at the substation, which is situated about 100 ft from the building. Electrical failures, if they should occur, set off a horn alarm, and ground indicators have been installed in the three phases.

To facilitate welding repairs anywhere in the plant a welding-power line has been installed with taps at various points throughout the structure. The welding generator is permanently installed at ground level in the plant and the ground connection is made at that point. The electrode holder, electrodes and 50 ft of welding cable is all the welder need carry to make repairs in any part of the plant.

Streams of water and solids from screens and pumps are handled in steel pipe and reinforced Goodrich rubber hose. The hose provides long-radius bends in these lines to greatly reduce the problems that might arise from abrasion in all-metal lines. Furthermore, the installation of such lines is made easier through the use of the rubber sections.

Kocher Coal operates its own fleet of trucks for hauling to certain markets. These outfits are made up of 10 tandem trailers (20-ton) and 11 Mack and International tractors. A Hough Payloader is used in stockpiling and reclaiming service and a Caterpillar D-6 bulldozer is available for general service.

A novel "thank you" for past patronage was offered his truck customers by Mr. Kocher shortly before Christmas last year. He placed a steer on the spit and served hot roast beef feasts to the truckers as they arrived for coal. The steer was on display in a small corral near the plant for a few days prior to the event.

Mr. Kocher also has taken steps to make the plant area attractive to customers and passers-by. The dikes around reservoirs and settling ponds have been planted in evergreens and grass, the buildings are brightly painted and identified by well-executed signs and the Kocher trucks are kept in spic-and-span order.

If YOUR ANSWER IS Yes TO ANY OF THESE QUESTIONS...

- ☐ Are you loading by the rope-and-hoist method?
- ☐ Are you loading by the belt-conveyor system?
- ☐ Do you ever have bottle-necks at your loading points?
- ☐ Would you like to cut loading costs?

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Coming in *Coal Age*...

The editors of *Coal Age* are planning to attend all important industry meetings which are traditionally held in the Fall. Watch for staff-written abstracts of proceedings in the November, December and January issues of the meetings of ME-MMA, IMI, KMI, CMIA, the Greenbrier meeting, National Safety Council, National Safety Contest and others.

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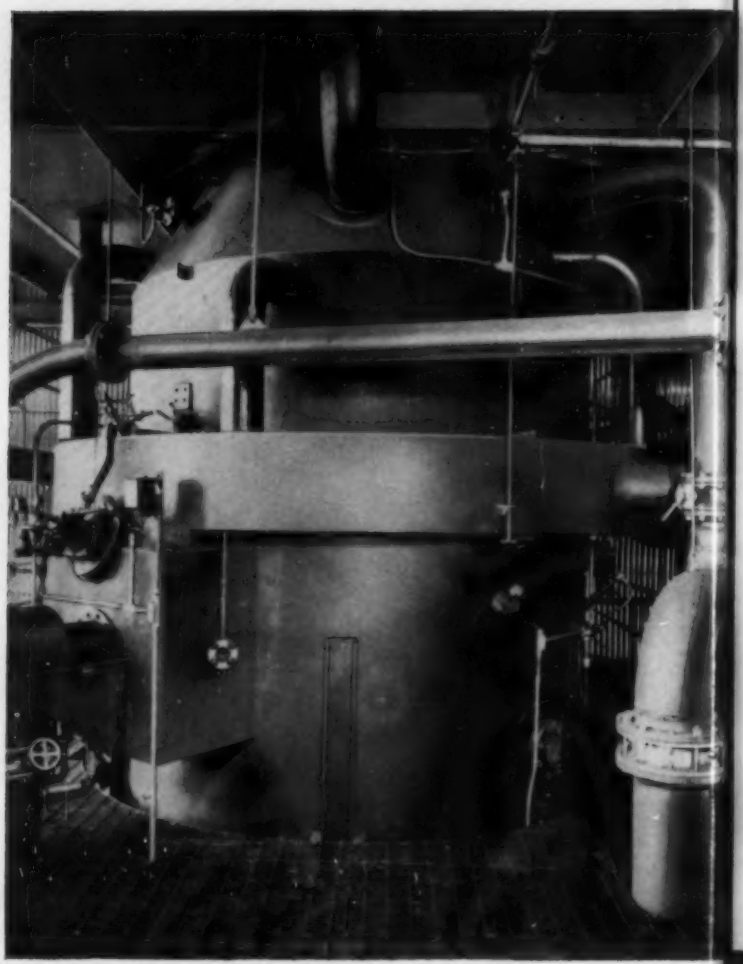
DORRCO FLUOSOLIDS® SYSTEM In Thermal



FIRST INSTALLATION: At Peabody Coal Co.'s Lynville, Indiana, preparation plant, FluoSolids system easily handles feeds of 69-107 tph, with moistures varying from 10.1% to 22.4%.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

Paces Progress Coal Drying Technology

Capacity of Dorr-Oliver fluidized installations reaches 2,300 tph of coal as industry adopts new technique for greater drying efficiency, more uniform production

One of the fastest-moving trends in coal preparation is the adoption of fluidized drying techniques in place of other thermal drying methods. The figures for the Dorrco FluoSolids system for coal drying tell the story:

Before July, 1955—No units in operation.

Today—8 units in 7 plants, either on-stream or scheduled for imminent start-up, dry 2,300 tons of coal per hour, removing 40,000 gph of water.

Acceptance of the FluoSolids system reflects the industry trend to fluidization. Dorr-Oliver, leader in the development of this new coal drying method, made the first fluidized drying unit to go onstream . . . is now building the largest (800 tph) . . . has more units on-stream than all other suppliers combined.

Behind the growth in FluoSolids capacity is a record of satisfaction by leading producers who have made the switch from other drying methods. Their experience confirms these inherent advantages in the system:

Greater Economy. Heat required to evaporate one pound of water often is as little as 1600 BTU.

High Capacity. A single 14' dia. unit can dry up to 800 tph.

High Water Removal. Each dryer can remove up to 50 tph.

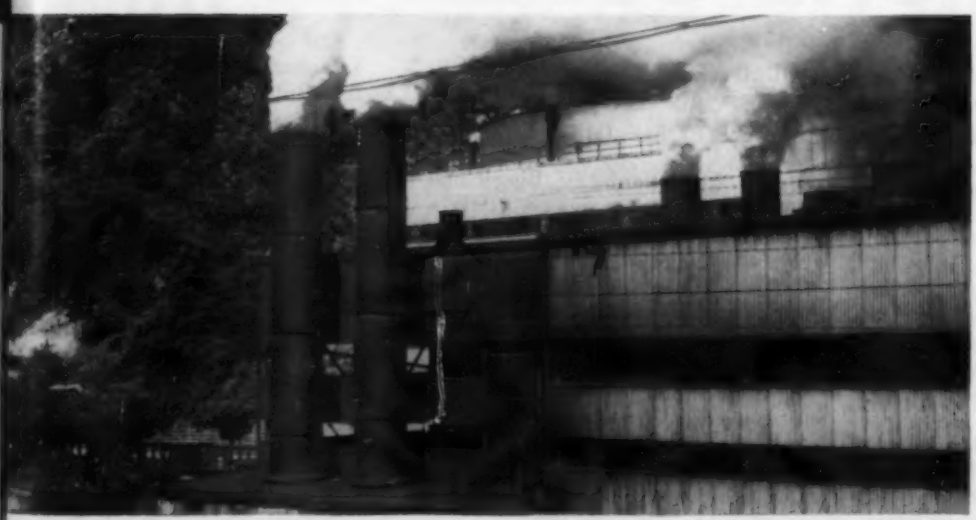
Greatest Feed Size Range. Only Dorrco dryers can handle any feed from filter cake up to 1½" x 0 coal.

Product Uniformity. Complete instrumentation insures uniform operating conditions, yields a product with no "over or under drying".

You can make your coal preparation plant more efficient and economical with a fluidized drying unit. And your operations don't have to be king-size. With a Dorrco FluoSolids system, you can handle 75 tph as economically as 800 tph.

For information about the latest on this new technique, drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut.

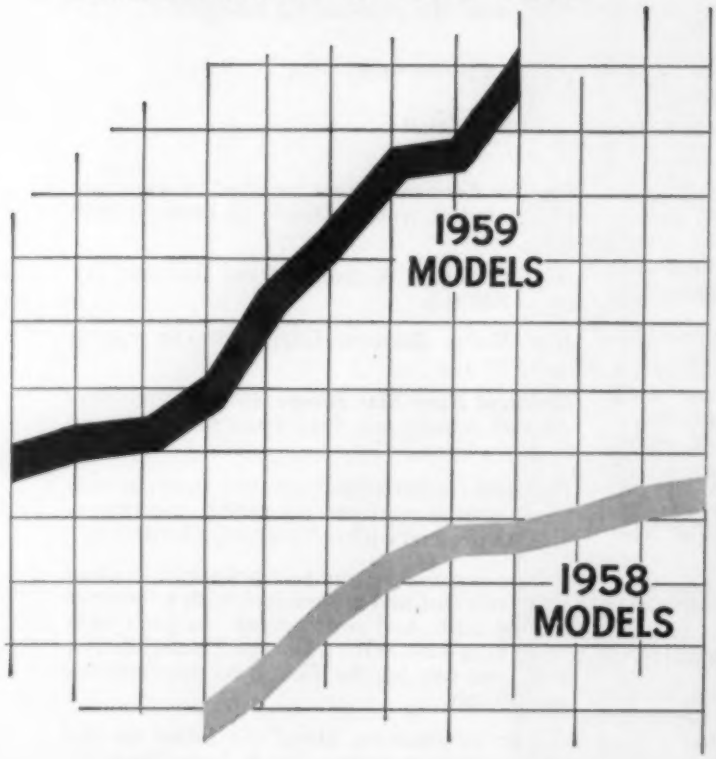
Dorrco and FluoSolids—T.M. Reg. U. S. Pat. Off.



RECENT INSTALLATION: At U. S. Steel's Gary, W. Va., preparation plant, drying section comprises these two 14' I.D. Dorrco FluoSolids dryers plus auxiliary equipment. These remove 70 tph of water from 600 tph of ¼" x 0 coal.

The BIG SUCCESS

1959 FORD SUPER DUTY TRUCK SALES MORE THAN DOUBLE THOSE OF LAST YEAR



1960 FORD SUPER DUTIES

SKYROCKETING SALES OFFER ADDED TESTIMONY TO THE TOUGHNESS AND RELIABILITY OF FORD "BIG V'S"— *NOW* THEY'RE MORE DURABLE, MORE FLEXIBLE THAN EVER!

Ford's increase in sales of Super Duty Trucks, while impressive in itself, by no means tells the whole story. Over half of the 1959 unit sales were the result of repeat orders from operators like Trucking Contractors, Inc., who bought because the Ford "Big V" provided the kind of performance and durability needed for their work.

And for 1960, the Ford Super Duties offer additional refinements designed to provide an even greater degree of dependability. Bigger optional axles and increased GVW's permit greater payloads and more profitable operation. Automatic radiator shutters to keep the engine temperatures within the most efficient operating range, submerged-type electric fuel pump to prevent vapor lock, and redesigned wiring for longer, more dependable operation are but a few of the improvements which add to the performance and durability of these units.

The changes offered for 1960 were tested and evaluated by America's foremost independent automotive research organization. The certified results of the studies by this impartial firm (name available on request) provide proof that Ford's Super Duty Trucks are even more dependable.

- **Certified Durability through close temperature control!** Independent research engineers certify that Ford's thermostatically controlled radiator shutters kept water temperature between 168° and 188° in severe mountain grade operation. The test truck with shutters blocked open

of the Big Truck Field

"Tried 8 in '58—bought 20 more in 1959," says Curtis E. Brost, President, Trucking Contractors, Inc. "In 1958 we bought 8 Ford T-850's with lightweight chassis options and specially built 5-batch bodies which gave us a full extra batch per truck. A 5-batch load is a real strain on the truck when you consider we're 'running the ditches' on this highway paving job in North Dakota. These T-850's worked out so well that we ordered 20 more in '59. Our Ford Tandems with the 477 engine give us good mileage and the drivers are real happy with them. It's a rough go on trucks with soft footing and dust so bad we have to drive with headlights on. Despite such operating conditions, downtime has been negligible and these '477' Fords have given us less trouble than other trucks we have operated."

with Certified Durability

under same operating conditions had a temperature range from 102° to 181°. The temperature variation of only 20° with shutters means less expansion and contraction in engine block and cylinder heads. Higher temperatures with radiator shutters permit leaner fuel-air mixtures with less possibility of raw gas washing down cylinder walls. Warm oil circulates more freely, reducing internal friction. All these factors contribute to longer engine life.

- **Certified Dependability with longer-lived electrical system!** Ford's '60 improved wiring harness and the 1959 wiring harness were subjected to shaker table tests plus constant exposure to oil and water vapors and temperatures of 200°. Certified results prove that the greater resistance to deterioration by heat, oil, water and abrasion obtained with the 1960 wiring harness more than doubles wiring harness life.

- **Certified Reliability with Ford's submerged-type electric fuel pump!** Dynamometer tests of engines with submerged-type electric fuel pump and conventional mechanical type showed that vapor lock was non-existent with Ford's electric pumps at temperatures up to 200°, whereas incipient vapor lock with mechanical pump resulted in a power loss of 9% at an underhood temperature of 200°.

Test results like these plus the experience of satisfied users are important but that is not all. For 1960, the Super Duty line has been broadened to provide even more flexibility in power train options. Get the facts from your Ford Dealer!

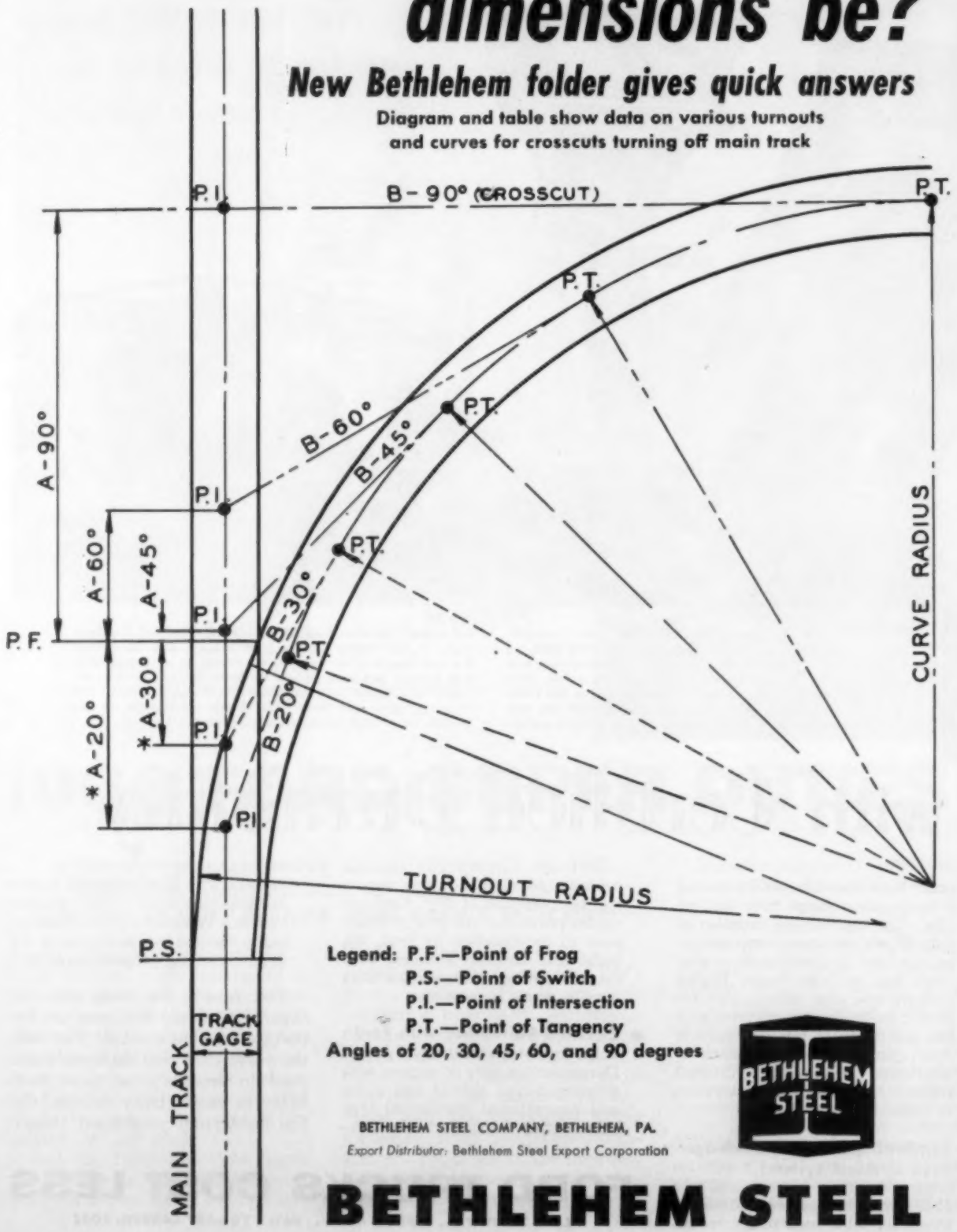
FORD TRUCKS COST LESS

LESS TO OWN . . . LESS TO RUN . . . BUILT TO LAST LONGER, TOO!

What should these dimensions be?

New Bethlehem folder gives quick answers

Diagram and table show data on various turnouts and curves for crosscuts turning off main track



Legend: P.F.—Point of Frog
P.S.—Point of Switch
P.I.—Point of Intersection
P.T.—Point of Tangency
Angles of 20, 30, 45, 60, and 90 degrees

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
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BETHLEHEM STEEL

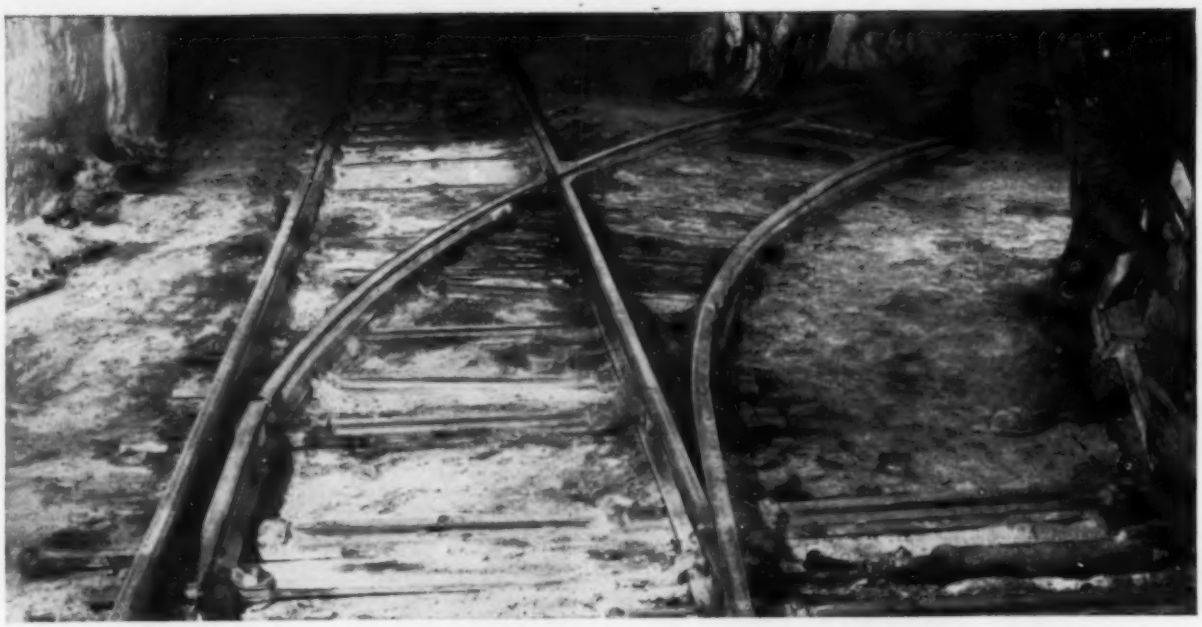

Table Showing Distances From Point of Frog to Point of Intersection, and From Point of Intersection to Point of Tangency for Crosscuts at Angles of 20, 30, 45, 60, and 90 Degrees.

TURNOUT				A					B				
				P.F. to P.I. Distances in Ft. Pt. of Frog to Pt. of Intersection					P.I. to P.T. Distances in Ft. Pt. of Intersection to Pt. of Tangency				
				Angle of Crosscut					Angle of Crosscut				
Frog No.	Length of Switch	Track Gage, In-ches	Radius, T.O. & Curve, Ft.	20°	30°	45°	60°	90°	20°	30°	45°	60°	90°
2½	5′-0″	36	28	—	*4′-11″	3″	5′-4″	17′-11″	—	10′-1″	13′-5″	17′-8″	29′-4″
		42	35	—	*5′-8″	5″	6′-7″	22′-1″	—	11′-10″	16′-3″	21′-8″	36′-3″
		44	37	—	*6′-0″	5″	7′-0″	23′-4″	—	12′-5″	17′-1″	22′-10″	38′-3″
		48	41	—	*6′-6″	6″	7′-8″	25′-9″	—	13′-6″	18′-9″	25′-2″	42′-3″
3	5′-0″	36	42	*8′-7″	*3′-6″	3′-7″	11′-0″	29′-5″	11′-0″	13′-8″	19′-2″	25′-8″	43′-3″
		42	52	*10′-0″	*4′-0″	4′-6″	13′-5″	36′-1″	12′-7″	16′-3″	23′-2″	31′-5″	53′-2″
		44	55	*10′-5″	*4′-3″	4′-9″	14′-2″	38′-1″	13′-1″	17′-1″	24′-5″	33′-1″	56′-2″
		48	62	*12′-0″	*4′-7″	5′-4″	15′-11″	42′-9″	14′-2″	18′-10″	27′-3″	37′-1″	63′-2″
4	7′-6″	36	74	*6′-11″	1′-0″	12′-11″	25′-6″	57′-6″	16′-8″	22′-4″	32′-5″	44′-1″	76′-0″
		42	91	*7′-10″	1′-6″	15′-9″	31′-1″	70′-3″	19′-7″	26′-10″	39′-5″	54′-0″	92′-3″
		44	97	*8′-6″	1′-8″	16′-9″	33′-1″	74′-9″	20′-7″	28′-5″	41′-11″	57′-5″	98′-3″
		48	108	*9′-3″	1′-11″	18′-7″	36′-8″	83′-0″	22′-6″	31′-4″	46′-5″	63′-9″	109′-3″
5	10′-0″	36	116	*3′-8″	8′-3″	26′-2″	45′-7″	95′-4″	24′-1″	33′-7″	49′-10″	68′-5″	117′-3″
		42	143	*4′-2″	10′-2″	32′-0″	55′-10″	116′-11″	28′-9″	40′-9″	61′-0″	84′-0″	144′-3″
		44	151	*4′-5″	10′-9″	33′-8″	58′-10″	123′-4″	30′-2″	42′-11″	64′-3″	88′-7″	152′-3″
		48	169	*4′-9″	12′-0″	37′-7″	65′-8″	137′-9″	33′-3″	47′-8″	71′-8″	99′-0″	170′-3″
6	10′-0″	36	171	1′-6″	18′-4″	44′-3″	72′-7″	145′-7″	33′-8″	48′-3″	72′-6″	100′-2″	172′-3″
		42	210	2′-0″	22′-5″	53′-11″	88′-8″	178′-1″	40′-5″	58′-7″	88′-8″	122′-7″	211′-2″
		44	223	2′-2″	23′-9″	57′-2″	94′-0″	188′-11″	42′-8″	62′-1″	94′-0″	130′-1″	224′-2″
		48	248	2′-5″	26′-3″	63′-4″	104′-3″	209′-9″	47′-0″	68′-9″	144′-6″	146′-0″	249′-2″
7	10′-0″	36	235	8′-8″	31′-5″	66′-8″	105′-6″	205′-5″	45′-1″	65′-5″	99′-0″	137′-0″	235′-11″
		42	291	10′-9″	38′-7″	81′-11″	129′-10″	253′-3″	54′-9″	80′-3″	122′-1″	169′-2″	291′-9″
		44	310	11′-5″	40′-11″	87′-0″	137′-11″	269′-3″	57′-11″	85′-2″	129′-9″	179′-10″	310′-4″
		48	347	12′-10″	45′-8″	97′-2″	154′-1″	301′-2″	64′-5″	95′-1″	145′-1″	201′-4″	347′-6″
8	15′-0″	36	292	16′-1″	44′-3″	87′-11″	136′-1″	260′-2″	55′-6″	81′-0″	122′-10″	170′-1″	293′-2″
		42	361	19′-9″	54′-2″	107′-11″	167′-3″	320′-6″	67′-7″	99′-4″	151′-4″	209′-10″	362′-1″
		44	384	20′-11″	57′-5″	114′-7″	177′-8″	340′-8″	71′-7″	105′-6″	160′-10″	223′-1″	385′-1″
		48	430	23′-5″	64′-1″	127′-10″	198′-6″	380′-11″	79′-7″	117′-9″	179′-10″	249′-8″	431′-0″

*Indicates that P.I. is located between P.F. and P.S. For intermediate track gages, interpolate between above figures.

If you would like to have these data in handy folder, No. 705

Write to **Room 1041, Publications Dept., BETHLEHEM STEEL COMPANY, Bethlehem, Pa.**

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. . . and they wasted Five Billion Dollars!

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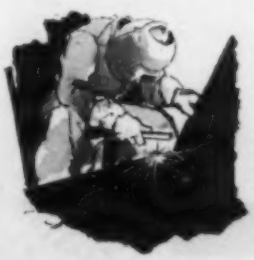

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Pattin specializes in roof bolting —it's our business, not just a sideline! Your business is important to us, and our service engineers are always available for consultation on your roof problems—ready to give you service when you need it! WRITE OR PHONE US TODAY for complete details.

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IN WESTERN STATES

Pattin expansion shells are available and serviced exclusively by Colorado Fuel and Iron Corporation, Denver, Colorado. Western mining companies should contact them direct for information and consultation.

The PATTIN split-type BOLT

The split-type bolt is one of the first slotted bolts, and continues to be a favorite wherever split-type bolts are used. Many mines still prefer this type. The bolt is a full 1-inch in diameter, with cut threads and furnished with hex or square nuts and various size plates and wedges.

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U S Steel News

SAFETY RECORD? Production record? New-methods idea? All of these will make dividend-paying news items for your company.

Giving Credit Where Credit Is Due

Look for opportunities to publicize noteworthy achievements of your workers in your company publication or local newspapers. Company and employees will benefit.

ONE OF THE PRECEPTS of successful management and supervision is to give people public credit for superior performance of their duties. "Recognition" is a wonderful morale builder, as each of us well knows. Sincere praise from a supervisor is heartwarming indeed. The alert foreman looks for opportunities to commend individuals or his crew for their efforts.

It may be possible to take one more step that will reflect credit upon the company, as well as upon the people. We have in mind the idea that editors of company publications and local newspapers are constantly looking for noteworthy items for their columns. You might consider these outlets when out-of-the-ordinary events occur. If your company is a good place to work, let it be known to the public. These matters should be handled through appropriate company channels, but in any event here are some possibilities you may wish to explore.

What To Look For

Employee Achievements—A supervisor who leads a crew through a long term of injury-free operation, or an employee who amasses a record of years of safe working, should be recognized for the achievement. Often these records lead to an award from the Joseph A. Holmes Safety Association, and that is worthwhile news. Spread the word to the editor of your company publication, your local newspapers and to the business papers covering your industry.

Local Color—There is news value in finding an unusual fossil in the mine, but only if you bring it to the surface and show it. Local safety meetings and promotion programs, appointments of company personnel to important committees and the standing of the company bowling team in the local league may get you some space in the local paper.

Promotions—Names make the news! People are interested in other people and their progress. Send pictures of the new appointees whenever possible.

Company Progress—An increase in annual production, the opening of a new

gets 21% longer rope life with Yellow Strand Flattened Strand

A service life increase of 42% over the 40-year average, and 21% over the best competitive ropes! That's the amazing record for Yellow Strand Flattened Strand told by Bald Mountain Mining Company at their mine near Trojan, South Dakota.

Using 4500' of ¾" 6x8 Yellow Strand Flattened Strand, ore cars are hauled up from the mine on one side of Bald Mountain . . . then lowered down the other side to the loading chute.

At rope speeds of 700-800 fpm, one string of Yellow Strand Flattened Strand helped move 97,000 tons of ore during its record 1⅓ years of service.

Exceptional service life like this can be yours, too. Check with your Yellow Strand Distributor—today!

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WIRE ROPE SLINGS CLIPS

mine or plant, the installation of new water-reclamation facilities, the redevelopment of strip-mine spoil areas—these are company activities that can be reasonably publicized because they have a good point to make and they affect the comfort and fortune of the community.

Personal Valor—When a man saves a fellow-worker from an injury or worse fate he should be properly acclaimed. Mine rescue teams should be duly recognized after they have performed well under pressure. A by-product of these public acknowledgments is that the value of training is effectively dramatized.

Ideas, Suggestions—A good idea that fills a real need is newsworthy. Your company may operate a suggestion system, and the story of a fellow receiving a healthy check for a good suggestion makes good reading and may excite others to offer valuable suggestions. Note at this point how a little effort spent on giving credit where credit is due returns dividends.

Production Records—An item on record-breaking shift production by a unit crew is a natural for the company publication, especially if the element of rivalry can be introduced. This can be extended to cover a day's operation at the mine, or a hoisting record at the shaft, or a day's run through the plant. The new big shovels are always pushing for yardage records and they usually get mentioned when they set a new high.

Community Service—Many of your company's employees devote a great deal of time to community enterprises. The service these people provide, often without monetary return, reflects great credit upon the company for which they work. The story of their interest and effort might make a good profile for your company publication.

The Media to Use

Company Publication—The "public" that is closest to you is the group made up of employees of your company and their families. Therefore, the "house organ" or news bulletins published by your company, should be informed of any interesting development within your sphere of influence. The company reporter will take notes upon which the story can be based. The story may be sent from there to local papers, industry magazines and the United Mine Workers Journal.

Local Newspaper—Reporters can dig out a lot of stories on their own initiative. However, most reporters and editors also work from leads and tips, and you can be a source of tips. You must have a story of real news value and you must stress these values in giving the facts to the reporter. Because of the nature of the publishing business, your story will have to compete for space in the paper with all the other information coming to the editor. If your first contribution doesn't make Page One, try again.

Radio and Television—We recently attended a company picnic at which the local radio station conducted a 15-min interview program direct from the scene. Don't overlook this possibility. All it requires is that the radio station be informed of the proceedings. Films of special events can be made for later use on television, and the techniques of recording material on tape adds materially to the flexibility of radio and TV media. When you plan a special event think of these possibilities for publicizing your company.

Community Festivals—Parades, town anniversaries, county fairs and local conventions will provide opportunities to tell the story of your company's contributions. Floats are effective, and "welcome" ads in the local paper won't do any harm. You may have opportunities to provide company sponsorship of teams in local athletic leagues. These demonstrate effective corporate citizenship on the local level.

The Dividends

Effective publicity does not consist of trying to "toot one's horn" or make a "silk purse from a sow's ear." But when there is something to be said, of interest to others, about any of its employees or about the company as a whole, it should be said. It is a positive, reasonable pursuit. No company can hide from publicity. The public notices resulting from such a policy may be negative and unreasonable.

Some of the dividends that can result from positive, reasonable publicity are as follows:

1. The company and its employees "come alive" in the community. Sniping at the company will be reduced.

2. The company becomes known as a good place to work. Giving credit where credit is due is the most honorable of all human-relation aids.

3. Stability becomes an outstanding feature of the working force. Employees of a well-managed company do have pride in their association, although they may rarely mention it.

4. Coal mining is properly recognized for its importance in the total life of the community.

Get to know the editor of the local paper and the manager of the local radio station. Acquaint them with what you are trying to do. When you do, you may not have to worry at all about "bad" publicity.

Forecast: Cold, Dry, Explosive

OLD MAN WINTER is not very far away now. The icy blasts will be roaring about the property. It's going to be cold—real cold.

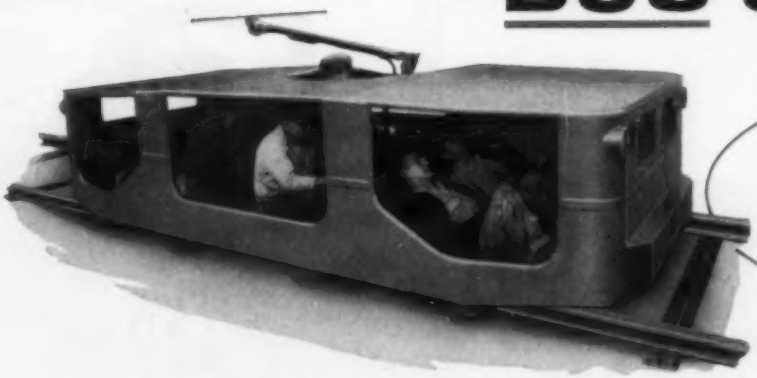
Worse than that, it's going to be real dry underground. You may be able to see the change at your mine right now. The droplets have dried from the roof, and each day the mine gets drier, and drier, and drier. It has been calculated that a southern West Virginia mine passing 200,000 cfm will release up to 69 tons of moisture in 24 hr into the air current.

Handling this problem is primarily a management and supervisory responsibility. Buck up your rockdusting procedures. Make sure you have a good quantity of the white lifesaver on hand. Inspect all rockdusting machines and overhaul them, if necessary.

Run a strict dust survey throughout the mine, paying special attention to seldom-traveled openings. Neglecting this important responsibility right now may have serious consequences if a cloud of dry, undiluted coal dust and a source of ignition react.

coming and going

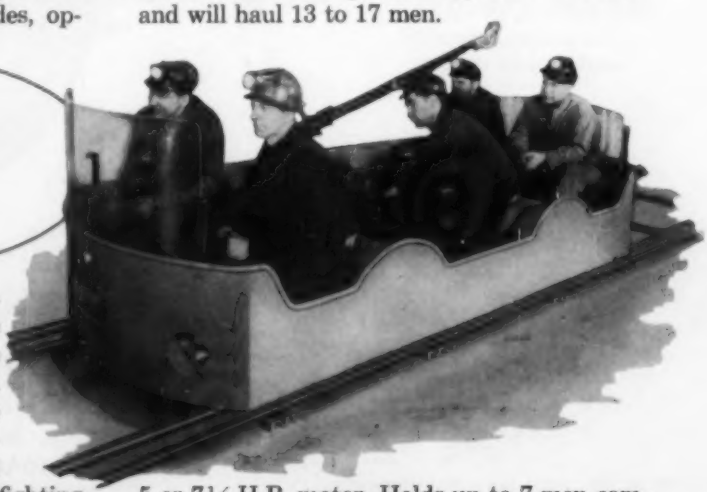
you take your profits on ~~the~~ every run with the Lee-Norse BUS & JITNEY



Lee-Norse MINE PORTAL BUS

■ There's no wasted motion with this self-propelled Portal Bus because it is fast on the take-off, saving manpower time for conversion into more tonnage. And it is designed for safety, with hydraulic operated running brakes plus mechanical emergency and parking brakes direct on the wheels. For severe grades, optional electric dynamic system produces braking effect from the motor for *extra* safety under all conditions. Also the split roof construction gives operator unimpeded, all directional view, while the trolley pole is always within quick reach. This bus is powered by 15 H.P. motor and will haul 13 to 17 men.

Lee-Norse MINE JITNEY



■ The Mine Jitney is the "Jack-of-all-Trades" of the mine fleet because its versatility enables it to be used on the regular job and for emergency. It can handle the job of furnishing fast, safe transportation of key personnel, maintenance crews and special groups; and can double up as an ambulance or fire-fighting equipment car. Designed with twin braking systems for added safety. Powered with either 5 or 7½ H.P. motor. Holds up to 7 men comfortably. Optional equipment: Plexiglas windshield, fire extinguisher, stretcher equipment.

LN **Lee-Norse Company**

CHARLEROI, PENNSYLVANIA

SPECIALISTS IN COAL MINING EQUIPMENT

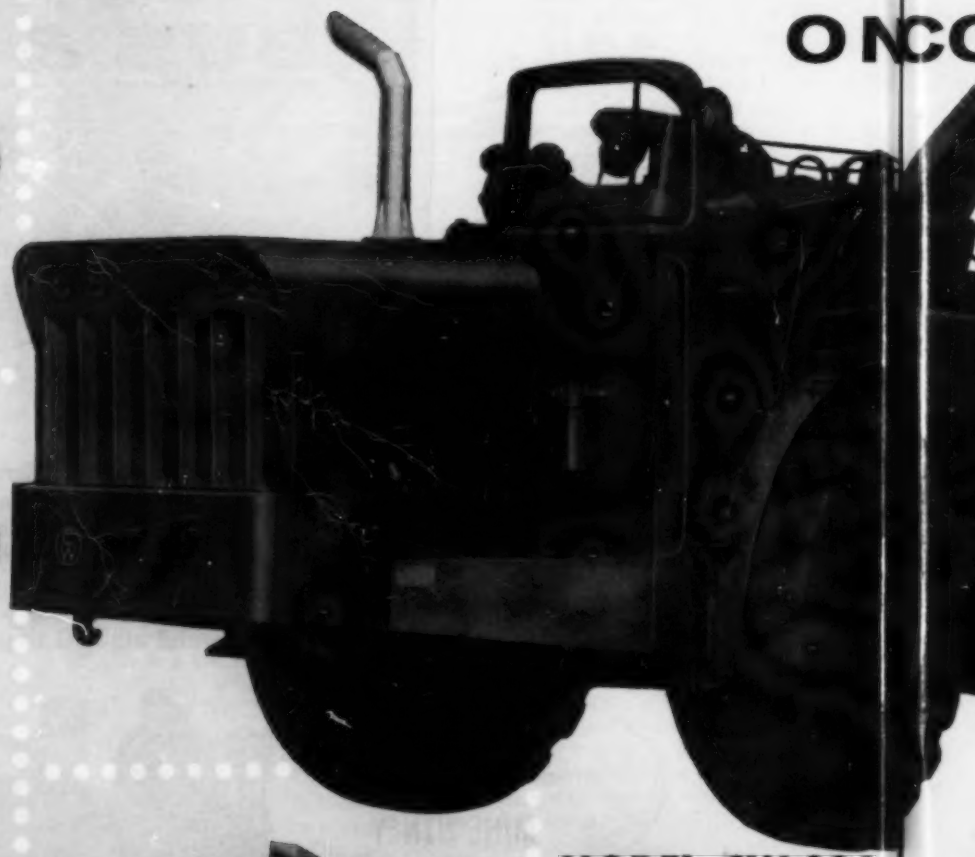
YARDS

ONCO

MODEL CW-220
20.0 cu. yds. STRUCK
27.0 cu. yds. HEAPED
INTERCHANGEABLE WITH MODEL CWD-221 REAR DUMP UNIT

MODEL CW-215
15.0 cu. yds. STRUCK
21.0 cu. yds. HEAPED
INTERCHANGEABLE WITH MODEL CWD-214 REAR DUMP UNIT

MODEL CW-27
7.0 cu. yds. STRUCK
10.0 cu. yds. HEAPED



MODEL CW-226
26.0 cu. yds. STRUCK
36.0 cu. yds. HEAPED

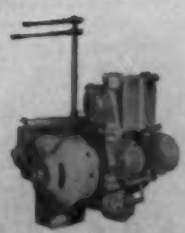
MODEL CW-320
20.0 cu. yds. STRUCK
27.0 cu. yds. HEAPED
INTERCHANGEABLE WITH MODEL CWD-321 REAR DUMP UNIT

MODEL CWD-221
21.0 cu. yds. STRUCK
31.0 cu. yds. HEAPED
35-TON LOAD CAPACITY
INTERCHANGEABLE WITH MODELS:-CW-220

INTERCHANGEABLE WITH MODEL CW-220 SCRAPER UNIT

MODEL CWT-20
20.0 cu. yds. STRUCK
27.0 cu. yds. HEAPED

MODEL CWD-321
21.0 cu. yds. STRUCK
31.0 cu. yds. HEAPED
35-TON LOAD CAPACITY



CABLE CONTROLS
for standard tractors in every horsepower range

AHEAD

COAL STRIPPING OPERATIONS
...The Curtiss-Wright Line

Let's skip the details and get down to basic facts about earthmovers. If you move more dirt, you make more money — it's as simple as that . . . and just about as easy, too, with the modern Curtiss-Wright line. C-W design features for high performance, easy operation and low maintenance put you yards ahead in production — dollars ahead in profit on any earthmoving job. Call your Curtiss-Wright distributor for complete information and specs on the machine performance matched to your job requirements.

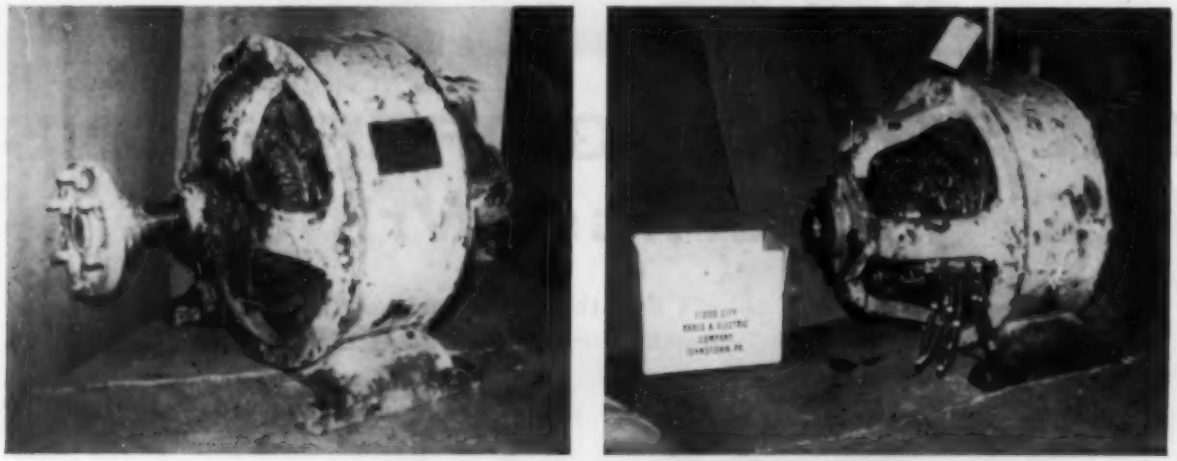
Your local Curtiss-Wright distributor is part of a nationwide sales, parts and service network devoted to making Curtiss-Wright users the most satisfied in the industry. You can depend on him for the most efficient, most cooperative service that it is possible to provide.

AD NO. 52-43

SOUTH BEND DIVISION, CURTISS-WRIGHT CORPORATION • SOUTH BEND, INDIANA

SOUTH BEND DIVISION
CURTISS-WRIGHT CORPORATION
SOUTH BEND, INDIANA

Operating Ideas



CHANGING old sleeve-bearing motor (left) to ball bearing mounting (right) is done with ordinary shop facilities.

Flange-Type Pillow Blocks Simplify Bearing Conversion

LOW-COST CHANGEOVER of old sleeve-bearing motors to ball bearing mounting is possible with ordinary machine shop facilities, writes F. Fraser MacWilliams, Flood City Brass & Electric Co., Johnstown, Pa. Mr. MacWilliams says that many sleeve-bearing motors have been changed to ball-bearing units by securing new end bells, but this is quite expensive. Furthermore, ball-bearing end bells are not available for many of the older motors. It is, however, possible to change any motor to a ball-bearing unit by using the flange-type pillow blocks available from several manufacturers.

The 40-hp motor shown in the illustrations was converted to ball-bearing mounting by putting the end bell in a lathe and then machining the extension, which held the sleeve bearing, back to the face of the bracket. The flange-type pillow block then was fitted precisely to the machined end bell. The changeover took 15 hr and total cost was much less than that of new end bells.

Since loosening or wear of the bolts holding the pillow block to the end bell would let the rotor get off center, it is important not only to drill and tap for the pillow block but also to counterbore the pillow block true with the bore of the bearing. In many cases the old end bell can be machined to fit this counterbore. In other cases a steel plate is welded to the end bell, and then a projection is machined on the plate to fit the bore of the pillow block. This bore must be exactly concentric with the original bore of the end bell.

Since flange-type pillow blocks are available in 2-, 3- and 4-bolt types, it is easy to pick out one that can be readily bolted to the end bell. They all have built in seals to keep dirt and moisture from entering the ball bearing.

How To Get More Life From Carbide Roof Bits

HOW can a mine operator get maximum drilling at minimum cost with cemented carbide roof bits? At first it seems the best way to get more holes per bit would be to use the drill's full thrust and speed up bit rotation. This technique won't always work, Carboloy carbide mining-tool engineers say. Chances are you end up with tip breakage, excessive wear and overload on the equipment.

Roof-bolt hole drilling is a two-stage operation, taking advantage of two forces transmitted from the drill. In the first, the drill tip is forced a short distance into the roof by the thrust action of the drill. In the second, the bit is rotated to clean away the rock to the depth of penetration.

In the case of a bit like a Carboloy PTV unit, General Electric's Metallurgical Dept. engineers say, too great rotational speed in relation to the low thrust will cause the bit to rub or grind rather than cut. The result is rapid dulling of the bit and increased frictional heat. This heat tends to destroy the tip-holding properties of the braze and the heat treat characteristics of the steel.

If the thrust is too great in relation to cutting speed the bit drills faster than the cuttings can be removed. Excessive cuttings choke the auger steel and bit and may cause steel breakage, machine stalling and overload as well as excessive bit wear.

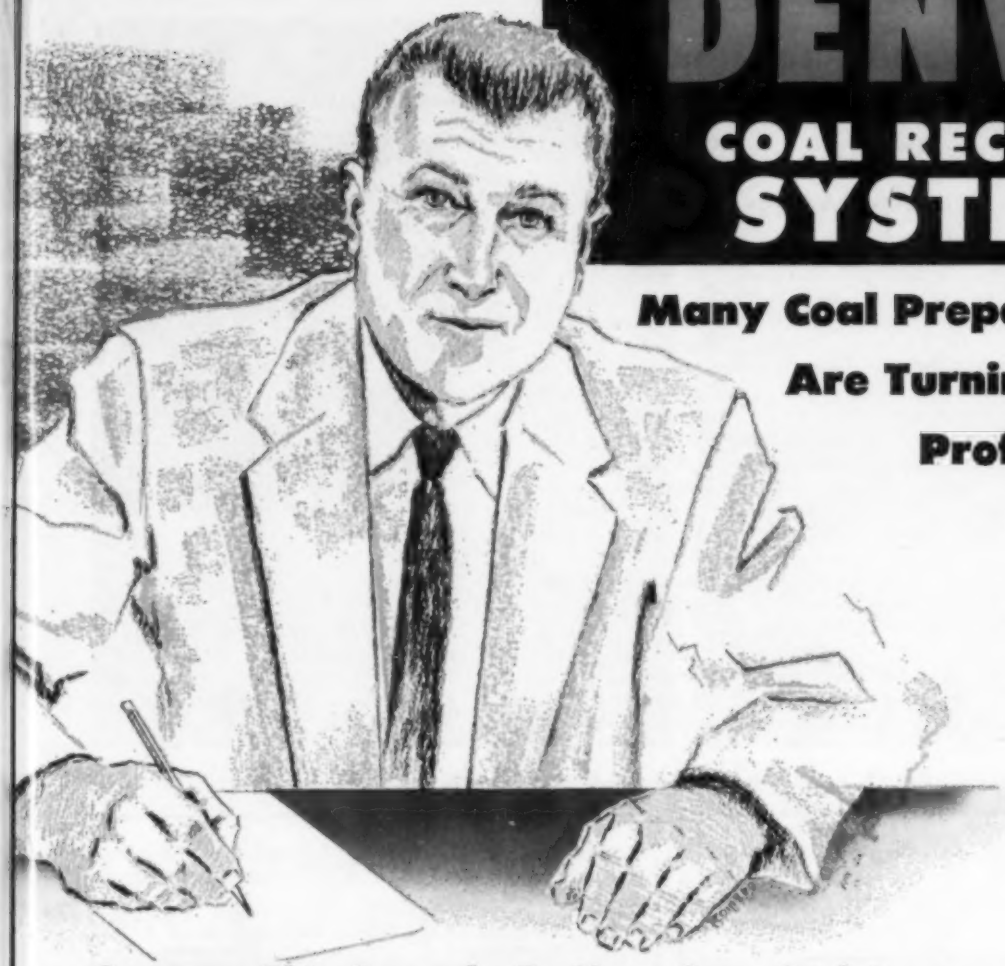
The way to save money in drilling, Carboloy engineers emphasize, is to keep a proper balance of thrust to rotational speed. Proper balance lets the bit cut continuously and keeps the hole free of cuttings.

To speed hole drilling in such formations as shale, loosely cemented limestone and the like, General Electric engineers recommend operating the drill at maximum rpms, increasing the thrust until the drill approaches stalling. Under this procedure, holes not only can be drilled faster, but the maximum volume of material can be removed per drill revolution. And bit life will be a maximum.

In hard formations, the best way to avoid burning up bits is to reduce the rotational speed and increase the thrust. This forces the bit into the hard formation and provides better cutting action with less bit wear.

DENVER

COAL RECOVERY SYSTEMS



Many Coal Preparation Plants Are Turning Waste Into Profits and at the same time . . .

(1) Recover marketable fines from waste water

(2) Remove solids from washery waste and simplify disposal

(3) Reclaim water in a closed water system

Compare This Example To Your Own Coal Preparation Plant:

(A) 1,000 G.P.M. WASHERY WATER IS SENT TO WASTE.

(B) WASTE WATER CONTAINS 10% SOLIDS AT 20% ASH.

(C) SOLIDS REPRESENT 26 TONS PER HOUR AND CONTAINS 84% COAL THAT RUNS 5% ASH.

All washery solids (−28 mesh x 0) are sent to a simple Denver Coal Recovery System which, for this capacity, costs about $86,000 to $90,000, plus approximately $64,000 to $100,000 for installation. (Estimated total approximately $150,000 to $200,000.)

Ash in solids, reduced by Denver "Sub-A" Coal Flotation from 20% to 5%, is blended with coarse coal.

Efficiency of system is approximately 92% and produces some 20 tons per hour of 5% ash coal.

Solids in refuse effluent are dewatered to approximately 40% moisture and conveyed to waste.

Clear water overflow is recycled to plant. Efficiency of closed water system requires only approximately 42 g.p.m. make-up water to replace water lost in clean coal and dewatered refuse.

Total coal fines recovered: 20 tons per hour (280 tons per 14 hr. day) @ $5.00 per ton yields $7000 per 5 day week or $350,000.00 per year.

Operating personnel, overhead and maintenance are low.

The increased coal recovery from the fines should pay for this equipment and installation in less than six months and will accomplish these objectives:

(1) Recover Clean Coal Fines
(2) Remove solids from washery wastes and simplify disposal
(3) Reclaim water and close plant water system.

DENVER Equipment Company can supply you a complete, centralized service on Coal Recovery Systems. Estimates and projections based on reliable laboratory test information are available without cost to you. We invite you to use our experience in the fine coal recovery field. Write today!

"The firm that makes its friends happier, healthier and wealthier"

STANDARD RELIABLE 24 HOUR SERVICE EFFICIENT

DENVER EQUIPMENT COMPANY

DENVER 17, COLORADO Phone CHerry 4-4466 1400 SEVENTEENTH ST.

Operating Ideas (Continued)

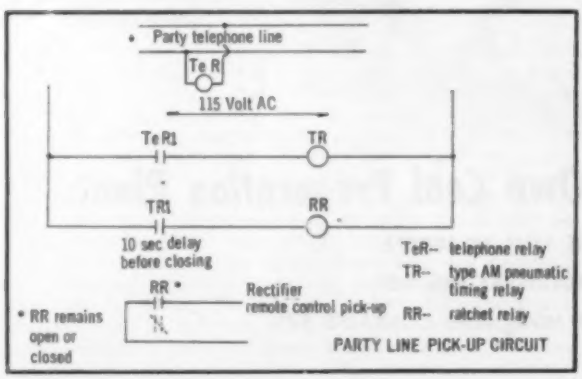
Light Projector and Camera Speed Underground Profile Measurements

PHOTOGRAPHS of a plane of light projected on the walls of underground openings are the key to a fast method of taking profiles developed by Charbonnages de France, the national French coal authority.

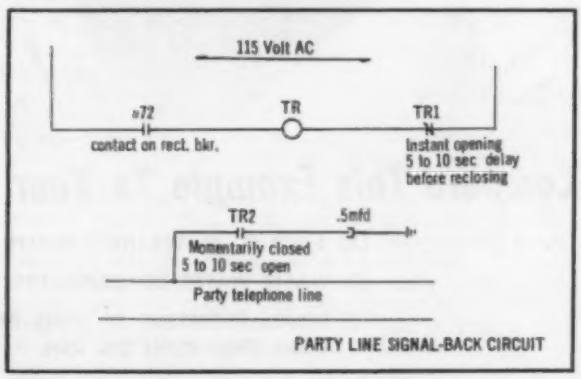
Equipment required for the method, known as Photoprofil, consists essentially of a special projector and a standard commercial 2¼ x 2¼ reflex camera. In the projector, a standard Oldham-Arras mine lamp is used as a light source. The lamp, rated 2.5 V and 2 amp, is operated at a higher voltage to obtain more actinic light. The light is projected through 360 deg in a plane by means of a Fresnal ring in plexiglass. The projector also includes horizontal and vertical scales, tubes of aluminum 50 cm long, in the illuminated plane.

Operation of the equipment is simple. The projector unit, mounted on a tripod, is centered by eye at the station where the profile is taken. For an extremely accurate profile, the projector is leveled to make sure that the illuminated plane is vertical. The camera is then set up with its lens at the same height as the reference target of the projector at a station where the entire illuminated cross section appears in the camera's viewing glass. The profile is then photographed. In an opening of about 100 sq ft cross section, using Kodak Tri X film, an exposure of 10 sec is required with the lens at f/4.5.

Area of the profile cross section is determined by projecting the negative on the board of a photographic enlarger and then using a planimeter. Scale is established by the apparent dimensions of the 50-cm aluminum tubes in the projection. Negatives are identified by placing a board with station number and date in the illuminated plane when the profile is photographed with the reflex camera.



PARTY LINE PICK-UP CIRCUIT



PARTY LINE SIGNAL-BACK CIRCUIT

Telephone-Line Circuits Control, Monitor Substations

TELEPHONE-LINE CIRCUITS, devised by the Vesta-Shannopin Coal Div., Jones & Laughlin Steel Corp., California, Pa. proved helpful in getting a new substitution on line while permanent overland signal lines were being installed.

In describing the control, W. G. Kegel, Vesta-Shannopin's general master mechanic, says that since all telephones on a mine party line are rung with a number of long or short impulses, a longer impulse than would occur on the telephone line was selected to control the substation. The accompanying diagram shows the components of the control.

A 10-sec ring was chosen and a timing relay was set in the pickup circuit to operate only when a continuous 10-sec pulse was registered. When the telephone relay contacts are held closed for 10 sec, the timing-relay contacts close in the ratchet-relay circuit, which opens or closes the ratchet-relay contacts. Depending on the position of the contacts after the last 10-sec signal, this starts or stops the rectifier.

Mr. Kegel notes that the same telephone line can be used to send back a signal to a central main control station and thus indicate whether or not the equipment is on line. This circuit is shown in the second wiring diagram.

When the rectifier feeder (72) closes, its auxiliary contact closes. This auxiliary contact is in series with an AM timing relay (TR) and when the relay picks up it is immediately de-energized by its own series contact (TR1). This contact, however, cannot reclose itself for a given time—J & L uses 5 sec. Another contact (TR2) is closed momentarily as the timing relay is energized. This contact grounded one side of the phone line through a 0.5 mfd, condenser, resulting in a periodic "beep" on the phone line. This tone does not interfere with conversation over the line and acts as an audible signal when the rectifier is on.

The two circuits working together can readily control and monitor any piece of equipment other than a fan. Fans require more positive monitoring.

A 9-ft. deep undercut . . . and four 9-ft. blastholes

Kennametal U10 Cutter Bits, mounted in a Joy 11RU Universal Cutter, cut rapidly across the face, leaving a coarse slack with few fines. These bits, with narrow inserts that draw a small power load, are reground an average of 10 times.

After undercutting, four blastholes are drilled into the face, using Kennametal DL 1⅞" Drill Bits on a Schroeder Hydraulic Drill. Completing a 9-ft. hole takes less than half-a-minute actual drilling time.

IN FIFTEEN MINUTES . . .

two men cut and drill this 18-ft. face . . . using KENNAMETAL* Bits

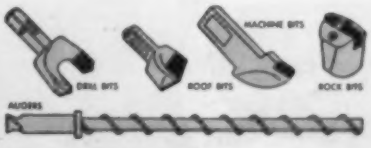
At the Wyatt-Seanor Mining Company, near Saltsburg, Pa., two men in each section cut and drill coal for two Joy 14BU Loaders and three shuttle cars. In maintaining this pace, where the Upper Freeport "E" Seam runs between 42-in. and 47-in. thick, it takes these two men an average of 15 minutes to prepare an 18-ft. face, from the time they start their sump to the completion of the final blasthole.

Using a conventional mining cycle—undercutting, drilling, shooting and loading out—this mine realizes a remarkable shift tonnage of 32 tons for each man at the face.

Ask your Kennametal Representative how the "Yellow Bits" can improve your production. Let him help you select and actually test in your mine the Kennametal Bit designed to best match your operating conditions. Call your Kennametal Representative or write KENNAMETAL INC., Mining Tool Division, Bedford, Pa. 8707

*Trademark

INDUSTRY AND KENNAMETAL ...Partners in Progress



AC and DC

Westinghouse motors are job-proved for all mining applications

Regardless of whether you need a-c or d-c motors . . . regardless of the particular application . . . you'll find there's a Westinghouse motor to do the job . . . a motor which has proved itself time and again for rugged dependability and long operating life.

Combining the most modern materials with proven dependability and durability, Westinghouse motors will help you increase production through more efficient service . . . will help you decrease capital investment by giving you many extra years of reliable performance.

Westinghouse motors . . . either a-c or d-c . . . are available in all ratings, mountings, enclosures . . . standard or special design. Prompt delivery is backed by expert application and service-engineering assistance.

For complete information, contact your nearby Westinghouse representative. Or, write Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

J-22120

YOU CAN BE SURE...IF IT'S Westinghouse

Equipment Developments

New Facepiece

For gas masks, hose masks, air line respirators and demand breathing apparatus, a completely new-type facepiece has been developed by Mine Safety Appliances Co., Pittsburgh 8. "Clearvue" features a large single replaceable lens. Designed to eliminate fogging, it is said to have an improved speaking diaphragm and built-in accommodation for prescription glasses. The facepiece, reports the firm, will be used in virtually the entire line of MSA masks and breathing apparatus. The user can replace the "wrap around" lense assembly quickly in the field by removing formed wire fasteners and using them to hold the new lense. Inspired air is directed over the lense surface by a ducting arrangement and moist exhaled air is diverted by a system of baffles to prevent lens fogging.

Tractor Shovel

A new 1½-yd tractor shovel, Model HD-6G, is in production at Allis-Chalmers Mfg. Co., Milwaukee, Wis. A 4-cycle diesel engine rated at 72 hp powers the tractor shovel which has 4 forward speeds from 1.5 to 5.5 mph and 2 reverse speeds of 2.0 and 4.1 mph. Dumping height of the unit is over 9 ft and the curved-bottom bucket tips back 40 deg at ground level. It has 21,500 lb of "pry-out" force at the cutting edge. Extra heavy-duty truck frame guards and truck wheels are standard equipment. Hydraulic lines and hoses for the entire unit are equipped with reuseable fittings for easier replacement. Other features of the new HD-6G cited by Allis-Chalmers are greater operating ease and comfort with good control grouping, better all-around visibility and simplified maintenance.

1960 Truck Line

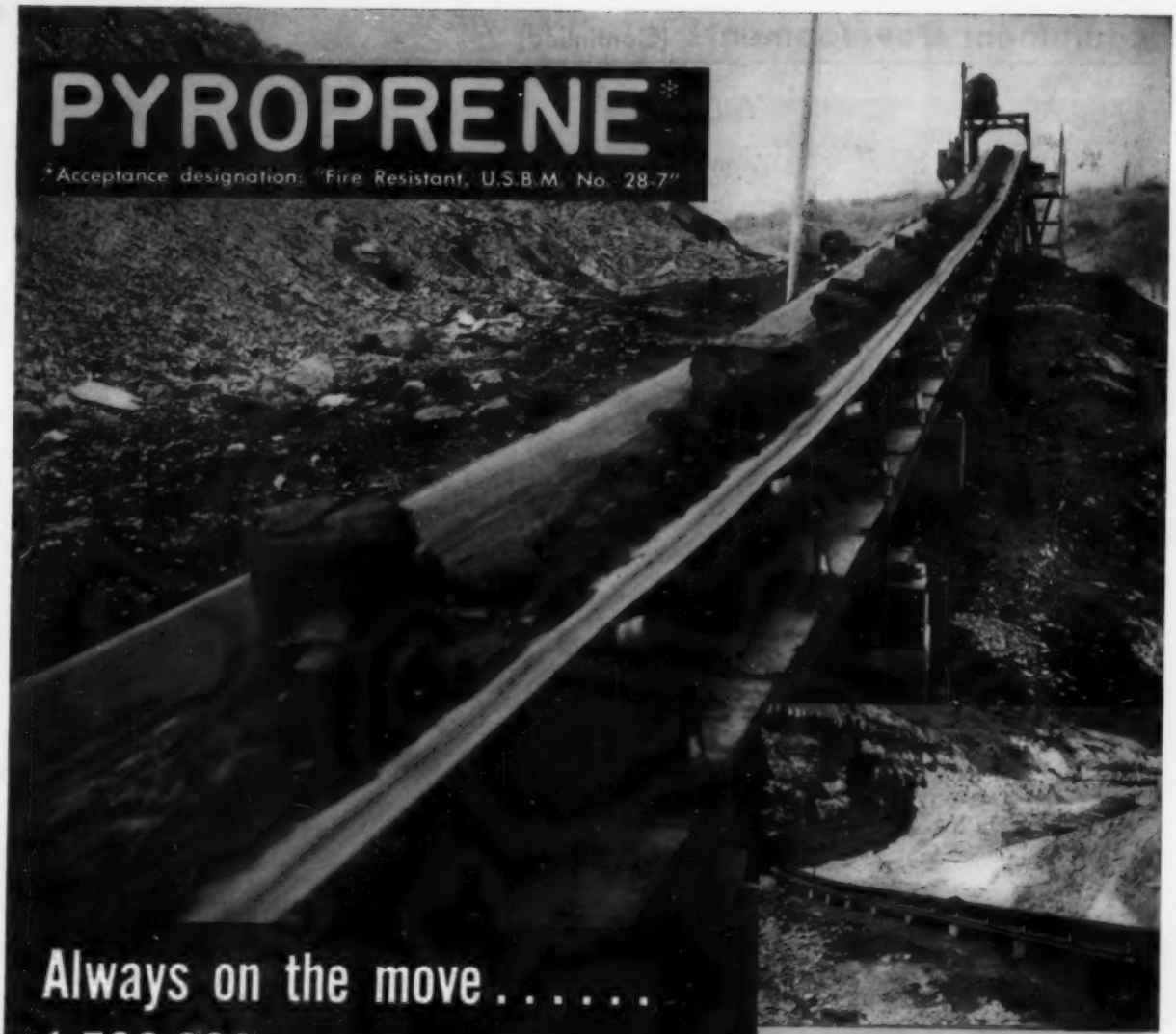
Advances in ride, handling, durability and safety through an exclusive new suspension system are credited to its new truck line by Chevrolet Motor Div., General Motor Corp., Detroit 2. "Revolutionary" independent front-wheel suspension with ball joints and torsion rod springs is incorporated on all except forward-control models and four-wheel drive units. I-beam front suspension has been replaced with a lighter weight, stronger assembly consisting of a crossmember and upper and lower control arms. Forged-steel steering knuckles and spindles are supported by ball joints attached to the outer ends of the control arms, which pivot on hardened steel shafts. Gains from independent suspension include less unsprung weight, reduced wheel fight, much less shimmy, and better caster, toe-in and chamber control, resulting in the nearest approach to passenger car ride and handling yet achieved in any but dual-purpose trucks, according to the firm. New styling and sweeping realignments in series and model designations, wheelbases and GVW ratings are part of a "total redesign" theme.

Large Earthmover

With the introduction of the new V-Power C Tournapull, LeTourneau-Westinghouse Co., Peoria, Ill., claims to be the first manufacturer to offer a V-8 diesel in a production earthmoving scraper. Teamed with a 20-cu-yd Fullpak scraper, the C' Pull's more powerful (optional) engine is a 270-hp GM 8V-71 8-cylinder diesel with rated horsepower at 2,100 rpm and maximum torque of 1,200. The high horsepower, according to L-W engineers, gives the C' Pull the best power-to-weight ratio in industry. Top acceleration is cited as another basic feature enabling the operator to reach his haul speed quickly —30% faster than on the standard powered C. Another ad-

PYROPRENE*

*Acceptance designation: "Fire Resistant, U.S.B.M. No. 28-7"



Always on the move . . . . . 1,500,000 tons per year

Huge sharp-edged pieces ride over ½ mile on the Acme-Hamilton Pyroprene Belt which is running on a Barber-Greene conveyor. Over a million and a half tons of coal a year travel on this belt. Trouble is non-existent. Proof-positive that Acme-Hamilton belts haul top capacity loads for longer periods with no loss of time, or maintenance.

Fire Resistant Pyroprene Compound, used in Acme-Hamilton U.S.B.M. accepted belts, will not feed or spread fire. The cover is Pyroprene; fabric plies and breaker fabric are sealed with Pyroprene before the belt is built. Cover has exceptional resistance to cutting, abrasion and gouging. Write Acme-Hamilton, Dept. CA-92.

Acme Hamilton

MANUFACTURING CORPORATION, TRENTON 3, N. J.

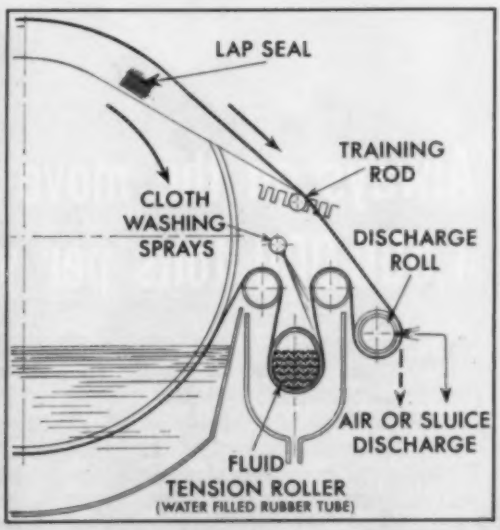
ATLANTA • CHICAGO • DETROIT • HOUSTON • INDIANAPOLIS • LOS ANGELES
MILWAUKEE • NEW YORK • PITTSBURGH • SALT LAKE CITY • SAN FRANCISCO • SEATTLE

vantage is interchangeability of engine parts with other GM series 71 diesels. The Fullpak scraper used with the unit is easy loading and has a struck capacity of 14 cu yd with a heaped capacity of 20 cu yd. It retains the low-angle loading and wide-dirt entry features which have gained wide acceptance, adds the firm.

New Dump Trailer

Hercules Steel Products Co., Galion, Ohio, reports it has available an extra-long dump trailer that enables haulers to carry maximum legal payloads with the security of a full-frame trailer. Key to the unit's hauling efficiency and ability to reduce deadweight to meet bridge laws imposed by individual states

is proper weight distribution between the dump trailer body and the chassis on which it is mounted, declares the firm. The trailer bodies, 28 ft long and made of corrugated steel to minimize weight and retain structural strength, are mounted on 31-ft shafts to obtain maximum payload of 43,000 lb. Aluminum models provide even greater weight savings, adds the company.



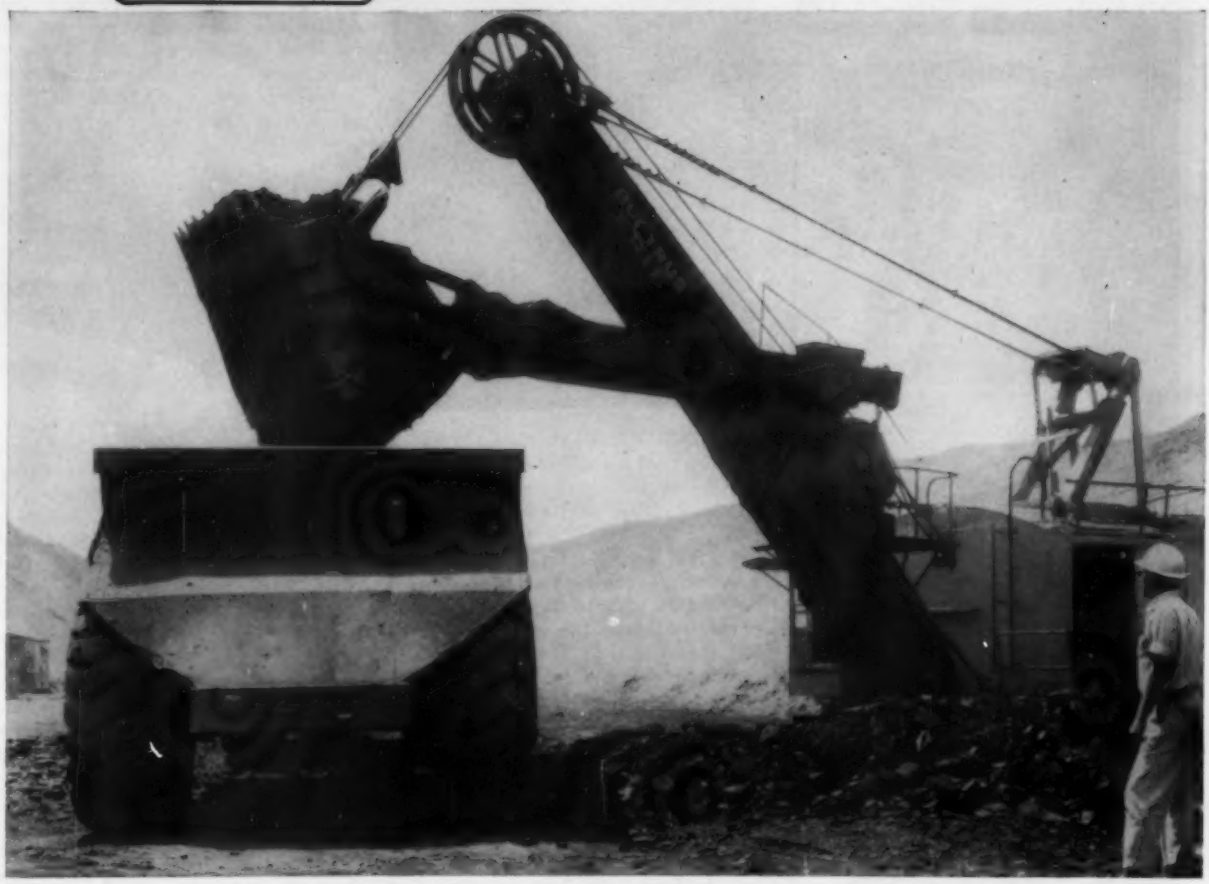
Cloth Discharger

A new device that will completely discharge cakes too thin for other filters without blow back or internal cloth blinding is now available from Peterson Filters & Engineering Co., Salt Lake City, Utah. The machine, which continuously removes the fabric medium from drum filters, washes it automatically, replaces it on the drum, permits fast drum cycles to reach ultimate capacity and results in extended cloth life because there is no scraper abrasion or cutting action from particles held in the threads of the cloth, says the manufacturer.

In the past, reports Peterson, fixed-diameter tension rolls were unsuccessful because they were not sensitive enough to compensate for the variable stretch in a filter cloth. The cloth would creep toward the point of least tension, and tracking the cloth back onto the drum required either constant attention or impracticable guide mechanisms, it is noted. The "Cloth Discharger," featuring "fluid tension," compensates for variation in cloth stretch utilizing sensitivity that virtually keeps each thread in the cloth at equal tension, says the firm.

The device has been in operation for over 2 yr at the U. S. Potash Co. (photo left) for recovering potash brine from their mud tailings. The device (photo right) provides not only the sluice discharge but a dry discharge and also eliminates the excess overflow water from the tension loop. A water-filled flexible rubber tube provides the fluid tension and a solution or air jets directly under the cloth discharges the cake which is then removed.

B.F.Goodrich



Those B.F.Goodrich tires haul 40 tons of coal over roads made of abrasive limestone

THE Buckheart Mine #17 near Canton, Illinois, is one of many strip mines operated by United Electric Coal Company. Here trucks with 40-ton coal capacity make continuous 8-mile round trips between pit and tipple. Roads are made of abrasive crushed limestone. This could be a real tire-killing job, but the company avoids this costly problem by using B.F.Goodrich Rock Service tires. In fact, B.F.Goodrich tires have been used at Mine #17 since 1938!

B.F.Goodrich builds extra service into the Rock Service tire 3 ways: (1) The tread is extra thick and specially compounded to resist rock cuts and snags. (2) Massive double-chevron cleats defy side-skids, give maximum traction in forward or reverse. (3) A FLEX-RITE NYLON cord body that withstands double the impact of ordinary cord materials. This B.F.Goodrich material resists heat blowouts and flex breaks and means more retreadable Rock Service tires and more retreads per tire.

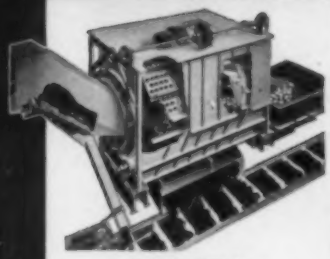
Follow the lead of successful mine operators. Switch to new B.F.Goodrich Rock Service tires and start saving. See your B.F.Goodrich Smileage dealer, who is listed under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Co., Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

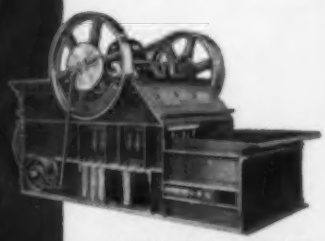
Smileage!

B.F.Goodrich *off-the-road tires*

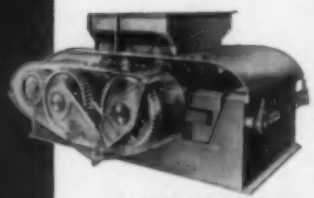
America's most complete line of CRUSHING EQUIPMENT



McNally Pittsburg Rotary Breaker
This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.

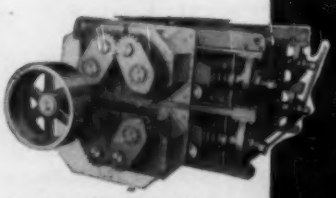


McNally Norton Vertical Pick Breaker
50% Less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic ROM Breaker
Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher
This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.



McNally Two Stage Crusher
This unit consists of a double roll primary crusher mounted above a double roll secondary crusher—compactly arranged into a single rigid structure.

Available From Stock and on Short Delivery
For immediate action on complete information write, wire, or call

McNALLY PITTSBURG MFG. CORP.

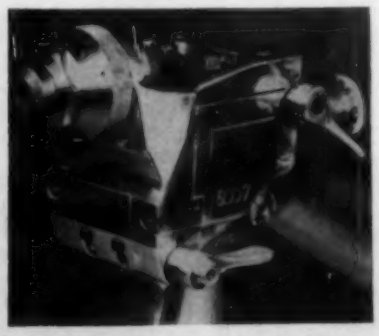
Pittsburg, Kansas Wellsten, Ohio

Equipment News (*Continued*)

REPAIRING BELTS—A new abrasion-resistant adhesive rubber sheeting for "do-it-yourself" patching of conveyor belt surfaces or similar types of repair work is a product of B. F. Goodrich Industrial Products Co., Div. of B. F. Goodrich Co., Akron, Ohio. Called "Armorline," the material sticks to metal, concrete, wood and other materials and can be applied almost as easily as a cold patch to an inner tube, says the firm. A thin gage of tacky rubber is bonded to the bottom of the material, protected by Holland cloth, which is removed before use. Neither expensive tools nor special skill are required for use, adds the manufacturer.

HARDER METAL—A new metal that can be hardened to twice the depth of previous materials is being used in track lines, shoes and rollers presently installed on Cat D8 and D9 tractors, reports Caterpillar Tractor Co., Peoria, Ill. The new steel can be hardened by heat treatment to ¼-in depth as compared to ⅛-in depth in previous steel, resulting in an increase in wear-life of up to 40%, says the company. In the track link, adds Caterpillar, the new steel not only increases rail life, but also holds the track pin in position more effectively and is more resistant to "pounding out" from pin and bushing action.

NEW BRAKE—A stainless steel braking device using the power of exhaust gases, generally wasted, reduces vehicular operating and maintenance costs, according to the Committee of Stainless Steel Producers, American Iron & Steel Institute. Power Brake Equipment Co., Portland, Ore., makes the brake which reportedly decelerates even massive payloads smoothly and is now in use by western truckers in rugged terrain. The device is said to be suitable for retarding motion of cranes, mine face breakers and similar equipment powered by internal combustion engines. Basically, the brake is a butterfly valve and shaft in a housing bolted directly to a stainless steel manifold outlet. The valve closes against a baffle to build up back pressure. Fully automatic or semi-automatic braking action may be selected by the operator on a hand lever with the position of the butterfly valve determining maximum magnitude of braking force. High manifold temeratures, often above 1,350 F, are withstood by the brake's stainless steel construction, adds the committee.



METALLIZING — Development of a heavy-duty high-precision automatic metallizing gun has been announced by the SpraRod Corp., Cleveland 4. Lightweight, the gun is designed to handle all wire sizes from 15 B&S gage to 3/16 in. Principal feature of the gun, which

Geoprene* Y-ground Portable Mining Machine Cable.

Super Coronol* Geoprene Type SH-D Ground Check Cable.

Super Coronol Geoprene Minepower Ground Check Cable.

General Electric offers a complete line of dependable cables

FOR A-C UNDERGROUND MINING

Here are three a-c underground mining cables from the complete G-E line which illustrate the hard-wearing, long-lasting qualities of *all* G-E mining cable:

Geoprene Y-ground Portable Mining Machine Cable. This cable, specifically designed for use on a-c shuttle cars, loaders, cutting machines, and the like, offers the utmost in flexibility and long life. The Y-shaped ground conductor separates three insulated-phase conductors, reducing the possibility of phase-to-phase faults in the event of cable damage. The Y-ground also has sufficient conductivity to trip the machine breaker, and simplifies the job of splicing.

Super Coronol Geoprene Type SH-D Ground Check Cable. The flexibility and sturdiness of this cable permit moving the load center forward without disconnecting the high-voltage power feeder. This cable, similar to standard Type SH-D, is available with an insulated ground check conductor in voltages up to 15 kv.

Super Coronol Geoprene Minepower Ground Check Cable. The non-metallic construction of G-E minepower cable provides light weight and ease of installation. The Super Coronol insulation on this cable—as on G-E Type SH-D cable—resists ozone, moisture, heat, and aging. The lead-cured neoprene jackets on both cables resist flame, oil, acids, alkalis, and sunlight.

These special-purpose cables meet various installation and application requirements. BOREHOLE CABLE • AERIAL CABLE • FLAMENOL® MINE TELEPHONE CABLE • SHOT-FIRING CORD • CORDX® LEAD-CURED TYPE SO CORD.

For complete information on General Electric cables for the mining industry, just mail the coupon for new, up-to-date bulletin.

Reg. Trade-mark General Electric Company

All General Electric mine cables bear the symbol P-108 of the Pennsylvania Department of Mines, and where required also carry the BM marking indicating listing by the United States Bureau of Mines.

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... another reason why

Autocar is the World's Finest

Up or down—forward or back—tilt! At the touch of a lever. This is the comfort of the contour seat in your Autocar cab. It's just one more quality characteristic that makes Autocar the world's finest heavy hauler.

Autocar
"World's Finest"

Division of
The White Motor Company
Exton, Pennsylvania

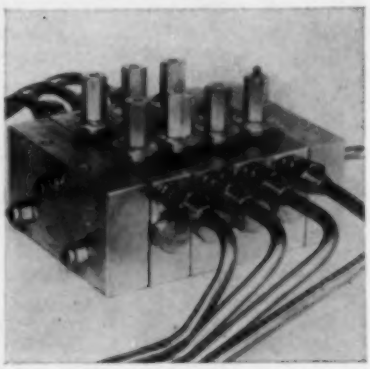
Equipment News (*Continued*)

handles all metals, according to the firm, is the new two-position air cap that adjusts itself automatically for easy lighting and fast, fine-grain spraying. The gun weighs about 4½ lb and consumes about 21 cpm of air.

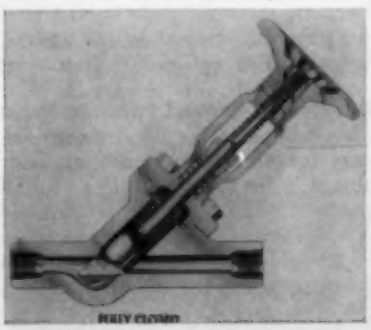
FLEXIBLE PIPE – General Rubber Corp., Tenafly, N. J., is making a complete line of "Screwed Coupling" flexible pipe, Type S, available in all sizes from ⅜ to 3 in diameter and in standard lengths from 18 to 36 in. The pipe is furnished with standard iron pipe threaded ends, either male-male, male-female or female-female, but special couplings or special lengths are also available. All sizes are rated at 250 psig maximum working pressure with a minimum 4-1 safety factor. Maximum temperature rating is 180 F.

SPRAY NOZZLE—A new "Quik-Clamp" nozzle with a long-life orifice has been put out by Link-Belt Co., Chicago 1. Made of hard cast manganese bronze to resist abrasive wear, the nozzle has a machined taper on the outside so that it fits snugly into the hole which has been drilled and taper-reamed in the pipe. For use wherever a pressure spray is needed, it has a higher hydraulic efficiency than a plain hole in a header pipe, says the firm.

FASTER DRILLING – Safer, simpler and speedier drilling of holes for roof bolting is now possible with its "Thru-Steel" dust collector, declares Mine Safety Appliances Co., Pittsburgh 8. The device prevents the spread of drilling dust by trapping it at the bit and drawing it through the hollow drill steel into a collecting tank. Approved by the Bureau of Mines, the collector can be installed permissibly on any approved roof drill and can also be adapted to existing MSA dust-collecting systems. Smooth drill steel used in the auger reduces the danger of snagging gloves, sleeves or clothing as with fluted-type augers, adds the manufacturer.



OIL SYSTEMS – Trabon Engineering Corp., Solon, Ohio, has developed a new "trouble" indicator for progressive-type centralized oil and grease systems. Previously, indicators were of the rupture disc type and required removal of the indicator cap and replacement of the special rupture disc, says the firm. The new Reset Indicator, available in a wide range of spring pressures (from 250 to 2,500 psi), pinpoints a blocked condition in the centralized lubrication system. When a blocked condition is cleared the indicator pin will automatically return to "normal" position. Available in ⅛-in NPT and ¼-in NPT sizes, the device is screwed into the alternate outlet or test plug tap of each outgoing line from the master and secondary distributors of the progressive Type M or MX lubrication.



STRAIGHT-FLOW VALVES – A new control valve in which the flow moves in a direct line through the valve at all throttling positions greatly reduces pressure drop and friction loss while giving infinitely variable throttling, declares the manufacturer, General American Valve Co., Corona del Mar, Cal. The K factor of the new valve is only .35 or 1/30 that of most globe valves, notes the firm. Principal advantage of the valve is its ability to pass more fluid or gas for a given pressure and with less turbulence, resulting in greater capacity from an installation without changing

Made its Reputation in the
SCHOOL OF HARD KNOCKS!
Roebling SH-D Portable Power Cable

From its rugged, abrasion and weather-resistant Roeprene® Sheath, right to the heart of its extra-flexible conductors, Roebling SH-D Portable Power Cable was designed to give full-power performance. The extra quality features show you why Roebling SH-D is better in terms of superior service, ease of installation and maintenance. For more facts, write Electrical Wire Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Extra—Special semi-conducting tape around each super-flexible, stranded conductor to prevent ionization.

Extra—Butyl conductor insulation for outstanding electrical properties, plus heat, moisture and ozone resistance.

Extra—Free-riding, all-rubber fillers for moisture resistance, splicing and terminating ease, unusual flexibility.

Extra—A combination of properties which permits operation with copper temperatures up to 90° C.

It's BIG!...It's FAST!...It's built to h

LW-80 HAULPAK®

80 tons

*Trademark HPC-2142-M-2

haul at lowest cost-per-ton!

of coal at 40 MPH

Brief Facts: 80-ton, 100-cubic yard capacity . . . 450-hp Cummins V-12 diesel engine . . . Allison transmission and torque converter . . . Four forward speeds to 40.1 mph; two reverse to 7.8 mph . . . Ten 18.00-33, 32 PR tires . . . Full time hydraulic power-assist steering . . . 6,552 sq in. of brake surface . . . Approx. 73,000 lb empty weight, 233,000 lb loaded weight.

Most profitable coal hauler ever made . . . the LW-80 moves 80 tons of payload at 40 mph. Apply those figures to your own operations, see what a difference they make on your cost sheets. This outstanding new coal hauler offers these features:

- Exclusive Hydrair* wheel suspension on all wheels
- Multiple-disc air brakes
- Sealed-for-life bearings—only four grease fittings
- Hydrair trailer hitch
- Exclusive power-transfer differential
- Air-actuated bottom-dump doors
- Trailer construction of high-tensile-strength steels
- Lowest center of gravity for greater stability

If you're ready for MAXIMUM efficiency in your coal handling, see your LW Distributor or write us for full information.

LW

Where quality is a habit

LETOURNEAU-WESTINGHOUSE COMPANY

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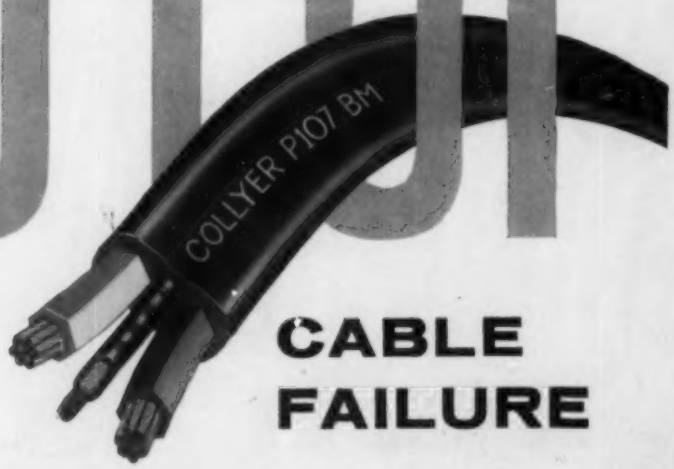
A Subsidiary of Westinghouse Air Brake Company

STOP



CABLE FAILURE

Put the "hex" on off-track mining machine down time .... with the new Collyer Twin Type G Portable Power Cable with hex-shaped parallel conductors. This construction *locks conductor assemblies in place,* prevents twisting and shifting, assures longer flexing life . . . AND LONGER CABLE LIFE!

Insulated with heat-resistant natural rubber . . . sheathed with Collyer's tougher, more durable Neoprene sheath compound to give greater resistance to abrasion, tearing, crushing. Compression cutting is "hexed", too, by natural rubber insulation!

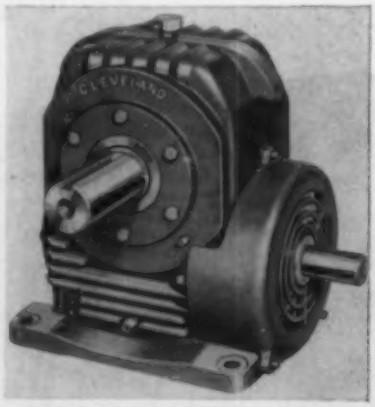
Write today for complete information on how this new cable can put a stop to resplicing down-time and replacement overhead.

Collyer

COLLYER INSULATED WIRE CO.
257 ROOSEVELT AVENUE
PAWTUCKET, RHODE ISLAND

Equipment News *(Continued)*

the dimensions of the piping or increasing the pressure, according to General-American. A further advantage of the "revolutionary" valve is said to be its resistance to clogging. Since all the flow is concentrated in a triangle-shaped orifice instead of in an annular ring it allows the passage of much larger particles of solid materials at any given orifice.



SPEED REDUCERS—An entirely new line of "high horsepower" speed reducers capable of transmitting as much as 80% more horsepower above that carried by conventional worm gear units, has been announced by The Cleveland Worm & Gear Co., Cleveland 4. Now producing reducers ranging from 1 to 40 hp, the company is testing larger sizes. Advantages cited for Cleveland reducers include rugged one-piece design, and fan cooling with the fan mounted on input end of worm shaft, making it equally effective in either direction of rotation. Worms are cut integral with shaft and accurately ground to a high surface finish on both thread flanks, adds the firm.

RECTIFIER LINES — Allis-Chalmers Mfg. Co., Milwaukee 1, has introduced 2 new lines of 25-V DC silicon rectifiers, one for heavy-duty industrial applications and the other for general purpose operations. The heavy-duty rectifiers are available in 400-, 500-, 600-, 750-, 1,000-, 1,500- and 2,000-kw ratings with standard sizes carrying 100% continuous loads, 125% current loads for 2 hr or 200% for 1 hr. The new 150 to 300 kw general purpose rectifiers come in ratings of 150-, 200-, 250-, and 300 kw, and for 3-phase 60 cycle primary voltages of 208, 240, 480 or 600.

PLASTIC CONDUIT — Southwestern Plastic Pipe Co., Mineral Wells, Tex., offers its plastic pipe for electrical conduit, stating that it has proven notably adaptable to even the most complex electrical systems. Weighing less than ⅙

30D SERIES

42D SERIES

Two New Additions to the Expanding Line of

EATON

More than
Two Million Eaton Axles
in Trucks Today

EATON TANDEM AXLES

Provide Famous Eaton Design in a Wider Range of Sizes

Two new Eaton Tandem Axle models now extend the line of famous Eaton Tandems into a much wider range of vehicle capacities—from 38,000 lbs. GVW to 55,000 lbs. GVW.

Eaton Tandem Axles offer advantages not available in other tandems. Included are important savings in weight and over-all length with no sacrifice of stamina. These operation-proven axles may be selected from Single Speed, 2-Speed, and Double Reduction types. The 2-Speed and Planetary Double Reduction models provide the many advantages of Eaton's exclusive planetary gearing design—substantiated by billions of miles of economical, trouble-free service.

Ask your truck dealer to explain the 10 big benefits you get with Eaton Tandem Axles—and how they can make your hauling operations more profitable.

EATON

AXLE DIVISION

MANUFACTURING COMPANY

CLEVELAND, OHIO

GOT WATER?

GET

FLYGT

...THE 24-HOUR PUMP

Reasons for the world-wide success of FLYGT B-80L pumps:

Electric, fully submersible, fully portable (185 lbs)
Instant pumping — no priming, no installation
Runs dry without damage
Takes high proportion of solids
Practically no maintenance or supervision
Frost- and fire-proof
6 hp, 3" hose, 330 GPM, max. head 170 ft.

Also: FLYGT B-38L — 1.8 hp, 75 GPM, 70 lbs, max. head 90 ft., 1½" hose; FLYGT B-80 Marine—6 hp, 330 GPM, max. head 145 ft., 3" hose; FLYGT B-150/200L — 65 hp, 3,000 GPM, max. head 220 ft., 6" or 8" hose, 1200 lbs. Higher heads with FLYGT pumps in tandem.

FLYGT

WEST OF THE MISSISSIPPI:

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MFGR. & SALES INC

1666 Ninth St.
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Santa Monica, California.

EAST OF THE MISSISSIPPI:

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Hoosick Falls, N.Y.

Continental Conveyors

for all materials handling needs

See your Authorized Continental Distributor

CGC

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Equipment News (*Continued*)

as much as steel conduit, it needs no special load-bearing supports for construction and installation, is lightweight and easy to handle, and requires no special equipment. The manufacturer declares that the plastic conduit is: corrosion resistant; non-sparking; explosion proof; and abrasion resistant. Assembled by cementing, the conduit looks better and simplifies coding, adds the firm.

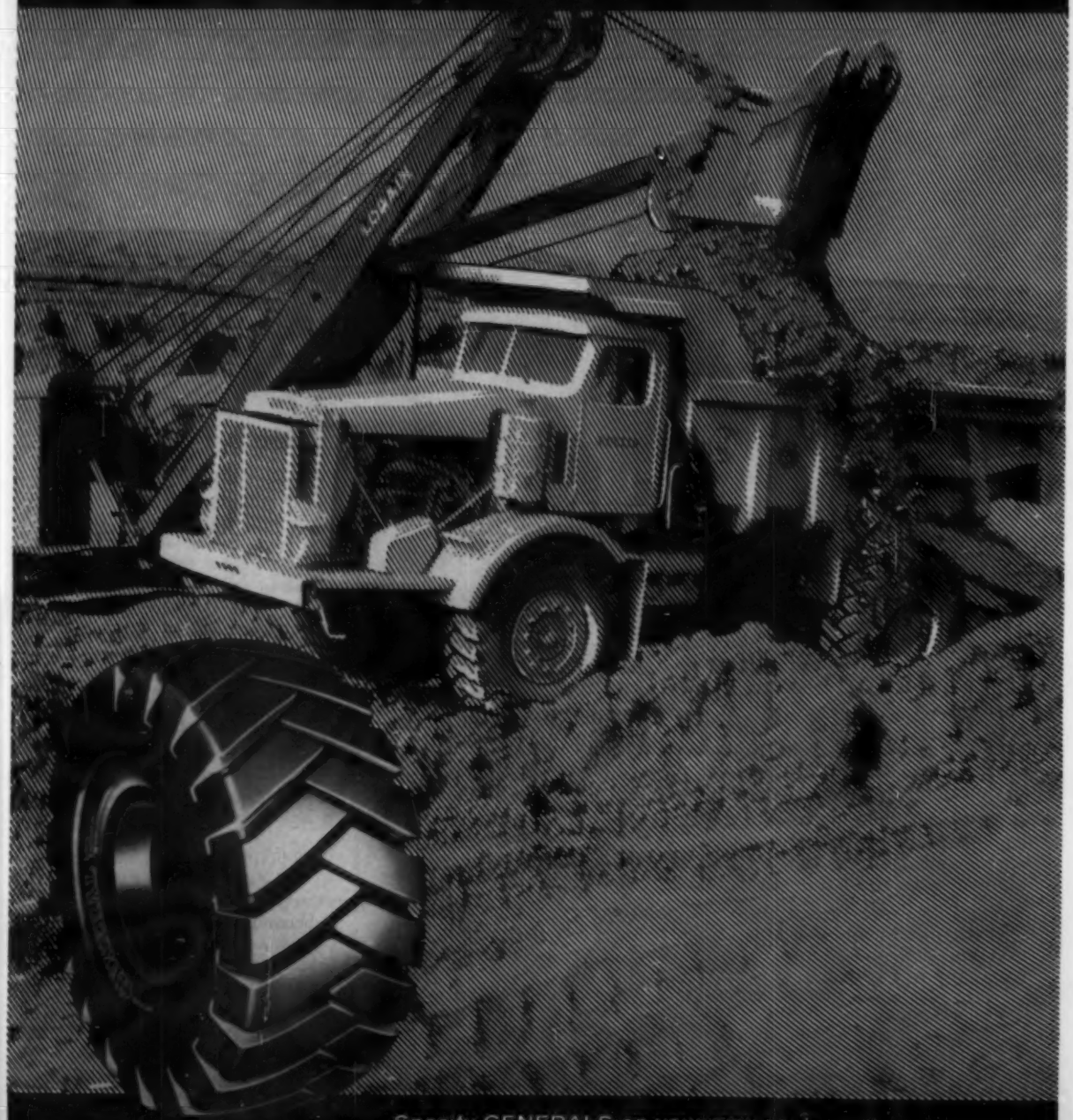
FINAL DRIVE GEARS—Cutting overall cycle time on long hauls is possible on good roads with high-speed final drive gears in two-wheel tractor-scrapers, according to Caterpillar Tractor Co., Peoria, Ill. Greater speeds available with optional gears, up to 23% faster in some case, can mean greater productivity and lower costs, it is noted. Such drive gears, available from manufacturers, are of greatest value and should be used only if: haul roads are in good condition; total resistance does not generally exceed 120 lbs/ton; haul distance is great enough to permit high speeds to be reached and held long enough to result in a lower cycle time.

POWER SHIFTING—With the introduction of new power shift transmissions on Caterpillar D8 and D9 tractors, one range-selection lever takes the place of the flywheel clutch lever, gear selection lever and forward-reverse lever. In terms of operator efficiency, says Caterpillar Tractor Co., Peoria, Ill., this means reduced shifting time and effortless simplified shifting. Heart of the power system is a planetary gear set driven integrally by the engine flywheel, which transmits ⅓ of the engine torque directly to the transmission input shaft and the remaining engine torque through the torque converter. Horsepower of both machines has been increased, with the Cat D8 now rated at 235 and the D9 model at 335. Caterpillar has also introduced a new Series D9 tractor with a choice of direct drive or torque con-

When you've got a tiger of a job by the tail and every extra trouble-free turn of your wheels means money in your pocket, you need stronger, NYGEN®-built

GENERAL TRUCK TIRES

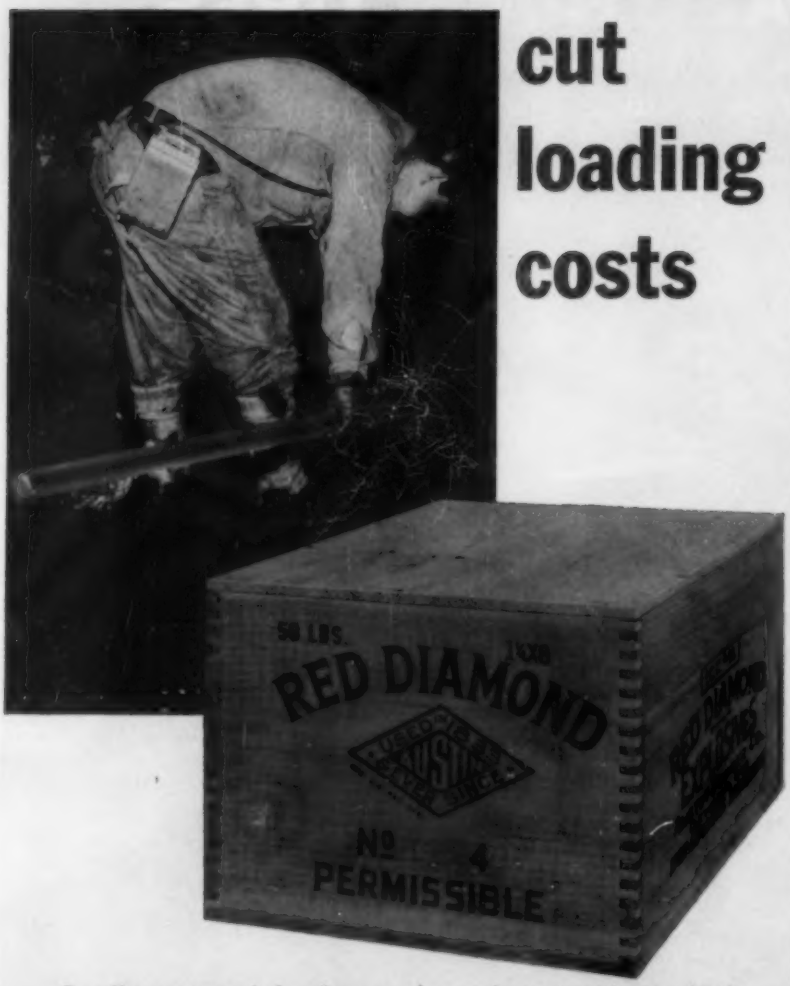
. . . the astounding tires that have proved their worth haul after haul . . . job after job!



Specify GENERALS on your new equipment

THE GENERAL TIRE & RUBBER COMPANY, AKRON, OHIO

Austin Permissibles cut loading costs



Loading costs and cleaning expense are important factors in the profit picture of many deep mines. And, they are factors that can be closely controlled through use of the right permissible dynamites.

Austin produces permissibles which solve virtually every problem connected with production of coal. They are available in speeds and strengths that meet such varying conditions as heavy binders, hard rock, thin seams, excessive water, etc.

Your Austin representative will gladly survey your present operation and show you how the correct type of permissible can save you time and money. Call him today or write Austin Powder Company in Cleveland.

AA-9088

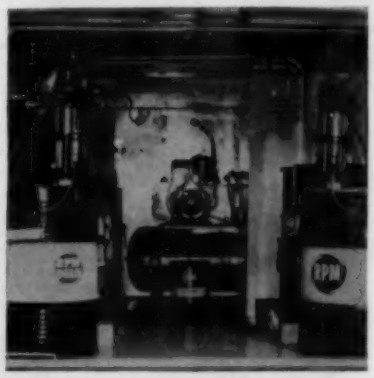
USED IN 1833 AUSTIN & EVER SINCE

AUSTIN
POWDER COMPANY
CLEVELAND 13, OHIO

explosives ◆ low grade ammonium nitrates ◆ primers ◆ blasting supplies
detonating fuse and connectors ◆ AP drill heads ◆ mine tools

Equipment News *(Continued)*

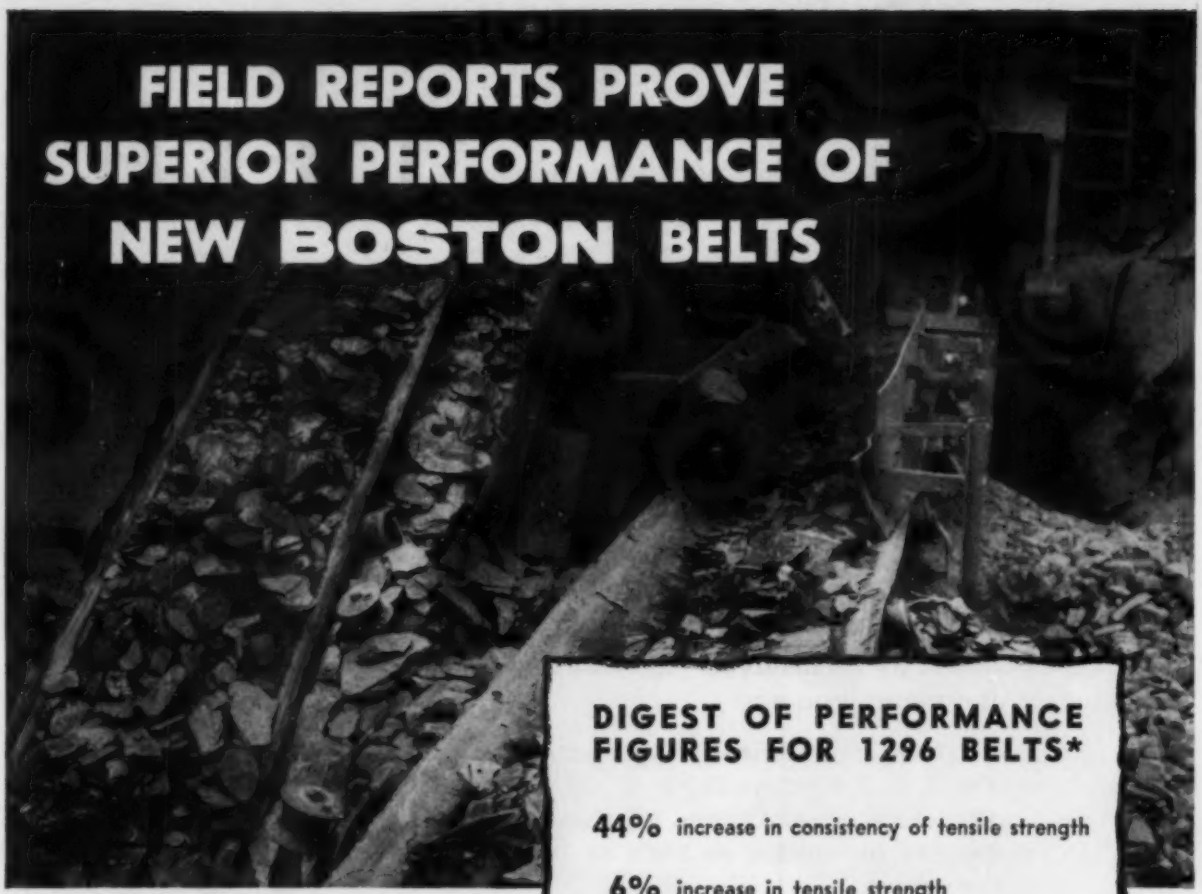
verter drive as well as the power shift version. Prime improvement in the new model is a redesigned undercarriage strengthening of all components and dimensional increases.



LUBRICATION—Portable lubrication rigs made by The Cypher Co., Pittsburgh 6, provide "on-the-job" service with minimum loss of time, reports the firm. Because of the different demands of an operation, it is noted, these rigs can be designed and installed on small pickup, large flat-bed or enclosed van-type trucks. Rigs are equipped with air compressor and six air-operated drum pumps, two for high pressure operations and four for low pressure jobs. These pumps are attached to either 55-gal drums or fabricated tanks. A spring-loaded hose reel, equipped with 35 ft of flexible hose will allow the operator to handle any job outside of the rig.

VIBRATOR—Application of the RC line of Cleveland Vibrator Co., Cleveland 13, demonstrates the ability to move stubborn materials from outdoor bins, regardless of weather or from hoppers to conveyor belts in an accurately measured stream, declares the firm. The water and dust-tight construction of the unit prevents any possibility of failure due to constant exposure, it is noted. The firm says that RC model vibrator generates a penetrating vibratory action employing the rotating eccentric shaft principle of developing vibration. But the devices are self-contained with no pulleys or belts, it is added. They are

FIELD REPORTS PROVE SUPERIOR PERFORMANCE OF NEW BOSTON BELTS



DIGEST OF PERFORMANCE FIGURES FOR 1296 BELTS*

44% increase in consistency of tensile strength

6% increase in tensile strength

130% improvement in consistency of elongation

*Compared to belts previously manufactured

HERE'S WHAT DOES IT!

The startling figures above are a direct result of two major belt manufacturing advancements — both developed by, and exclusive with, Boston Woven Hose & Rubber Co.

ADVANCEMENT #1 **BALANCED BELT CONSTRUCTION** for the first time equalizes ply stress so that each ply pulls its full share of the load. **BBC** eliminates lazy plies. A BOSTON exclusive because only BOSTON can combine Electronic Tension Controls with Rotocure, the continuous method of vulcanization, which assures uniformity throughout the belt.

ADVANCEMENT #2 **DULON** markedly improves the aging characteristics of BOSTON belts. An exclusive BOSTON research development, the tough specially treated cover compound stays resilient longer . . . makes the belt much more resistant to abrasion, gouging, tearing and oxidation.

BALANCED BELT CONSTRUCTION plus **DULON** add up to longer belt life . . . less trouble in service . . . greater economy.

BOSTON

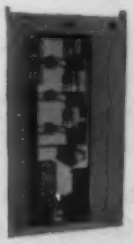
BOSTON WOVEN HOSE & RUBBER COMPANY
DIV. OF AMERICAN BILTRITE RUBBER CO., INC.
BOSTON 3, MASS.

THE BETTER WAY

The P&H way—"the better way" of design and construction puts P&H Electric Shovels in a class by themselves—they alone are not essentially the same as the shovels of a generation ago.

P&H has always been the pioneer developer of dramatic new designs and processes—this is why P&H Electric Shovels incorporate design fundamentals which make them different from all others. By their pioneering, P&H found "the better way" to production premiums as high as 10%, lower unit cost and more net profit for P&H owners.

Some exclusive P&H design fundamentals not found in other electric shovels are:

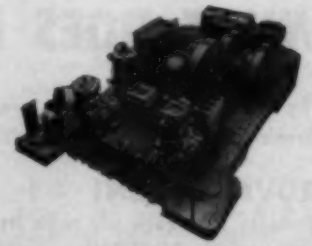


1. ELECTRONIC CONTROL

This patented P&H control accomplishes the quickest work motion reaction time known for electric shovels. Control maintenance expense is reduced as much as 80% by elimination of all moving parts for a completely closed circuit system.

2. MAGNETORQUE® HOIST DRIVE

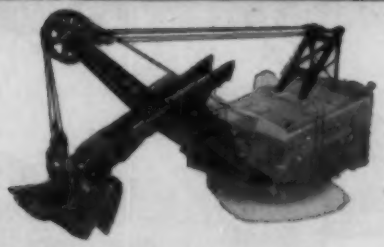
This patented hoist drive electro-magnetically transmits the full digging power of an A.C. motor direct to the dipper without motor generator set conversion to D.C. current! It gives up to 30% higher bail pull for more uniform digging speed and greater dipper fill factor.



3. FULL WELDED STEEL CONSTRUCTION

P&H was the originator of electric shovel construction by the unit welded rolled steel method. Their accumulated wealth of experience pays P&H owner dividends in the form of exceptional long shovel life in hard digging—accomplished by full welded steel construction.

"P&H is now the world's largest builder of full-electric and diesel-electric shovels. Only P&H manufactures their own electrical as well as mechanical components—designed specifically for electric shovel service—gives you the service assurance of single source responsibility."



4. ENCLOSED HOIST MACHINERY

Only on the P&H Shovel is all deck machinery—the power trains for hoist, swing and propel drives—enclosed in oil tight gear cases. No open gearings! Modern power train design at its best!

5. INDEPENDENT CRAWLER PROPEL MOTOR

Only P&H Electric Shovels have an independently motored crawler propel drive. P&H gives shovel owners the advantages of independent motoring—the basic principle of electric shovel design and purpose. The P&H is FULL-ELECTRIC in every work motion.

6. T-1 STEEL ... SHOVEL ATTACHMENT

Only P&H furnishes as standard a boom and dipper handle fabricated of ultra high strength T-1 steel for high impact absorption ability, especially important in sub-zero temperatures. P&H pioneered and is the most extensive user of rolled alloy steels.

P&H MINING EXCAVATORS

OUR 75TH YEAR

HARNISCHFEGER CORPORATION • Construction & Mining Division • Milwaukee 46, Wisconsin

P&H LINE

Full-Electric and Diesel-Electric Shovels & Draglines: 3½ through 10 yds.

Diesel Excavators: ½ through 3½ yds.

Truck Cranes: 10 through 80 tons

when the going gets rough—

give 'em "L"

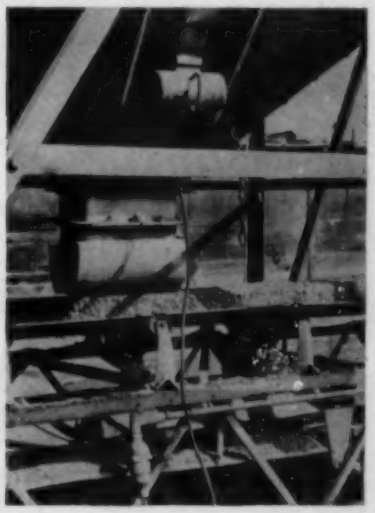
When the load is on the crane, you'll be glad you rigged with *Leschen*—the wire rope that's the same top quality in every foot of every reel. At Leschen there are new machines with exclusive new continuous-flow technique. Try Leschen Red-Strand Wire Rope. Its uniform quality makes your operation safer, your replacement time farther in the future.

Leschen Wire Rope Division,
H. K. Porter Company, Inc.,
St. Louis 12, Missouri.

LESCHEN WIRE PORTER ROPE DIVISION

H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.



totally enclosed with a built-in AC motor and eccentrics. The RC line comes in 3-phase, AC current in 11 common voltages. Working frequency is 3,600 impulses per minute.

LEVEL CONTROL — "Tellevel" bin controls, made by Stephens-Adamson Mfg. Co., Aurora, Ill., automatically control the level of material in bins. They are available in three types: normal duty, explosion-proof and heavy-duty. Each unit is a self-contained unit with a pendant float which operates a sensitive enclosed switch. The units are mounted in bins or tanks to regulate the level of bulk materials. As the material level rises or falls, the "Tellevel" will stop or start feed conveyors or elevators. The units can be installed to operate warning lights or horns. Ordinarily the control is connected for a normally-closed circuit but can be connected for normally open circuit just as easily.

ONE-USE BIT—The addition of one-use carbide insert drill bits to its line of CRD dust collection bits has been announced by the Le Roi Div. of Westinghouse Air Brake Co., Milwaukee 1. Be-

EXCLUSIVE "COLEDGE"* CONSTRUCTION

gives Quaker Thermoid Conveyor Belting extra life where it counts

Unique "Coledge" construction puts more rubber *at the edges* where it's needed, prevents ply separation, makes a more flexible and wear resistant edge where abrasion is greatest. Punishment at the edges—especially the tough use dealt out in mining—can kill most conveyor belting in a fraction of the lifetime of Thermoid-Quaker belting.

Tests show Thermoid-Quaker "Coledge" construction lasts and lasts on the same jobs where other belting fails. "Coledge" construction is available on all grades of Thermoid-Quaker belting.

What's more, all Thermoid-Quaker conveyor belting is prestressed in manufacture, so that the belt is actually in compression when you get it—ready for the heaviest load without strain.

Examine Thermoid-Quaker Belting with the exclusive "Coledge" construction at your Thermoid distributor's, or write for further information to Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Streets, Philadelphia 24, Pa.

*Patent Applied For

THERMOID DIVISION PORTER H.K.PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Diamond" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

acker

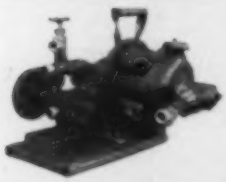
PACKSACK WORKS SAFELY UNDERGROUND ON COMPRESSED AIR!

Now, safety powered by compressed air, the Acker Packsack answers every need for a lightweight core drill for the mining industry.

The Packsack sets up quickly and is easy to operate — even where space is at a minimum. Use it for test holes, blast holes, plotting veins, wall sampling and exploration drilling.

For surface mining, the Packsack is available with a thrifty 5.5 H. P. gasoline powered drill.

Write today for Bulletin 22.-CA



AIR MOTOR DRIVEN PUMP

Lightweight air motor driven pressure pump weighs only 70 lbs. Capacity 10 g.p.m. Makes a compact portable pumping station.

LOWEST DIAMOND COST

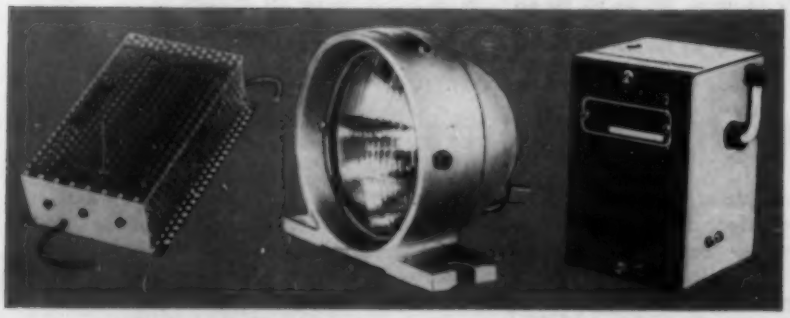
Acker Diamond Bits are scientifically designed and set for economical, long lasting operation.

ACKER DRILL CO., Inc. P.O. BOX 830 SCRANTON 2, PA.

Over 40 years of experience manufacturing a complete line of diamond and shot core drills, accessories and equipment.

Guyan®

HEADLIGHT RESISTORS
SEALED-BEAM HEADLIGHTS
HEADLIGHT SWITCHES



Guyan HEADLIGHT RESISTORS

For safety, long life and prevention of frequent burn-outs. Designed with ample capacity for your trolley voltage and the correct bulb voltage.

Guyan SEALED-BEAM HEADLIGHTS

PAR-46 sealed-beam lamps, encased in steel; with three lamp voltages:—heavy-filament 6-volt; long-lasting 32-volt; and current-saving 115-volt.

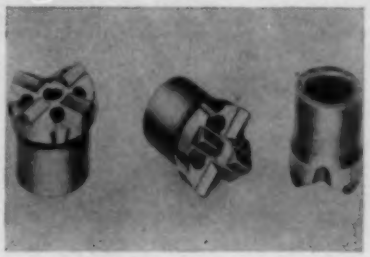
Guyan MERCURY TUBE HEADLIGHT SWITCHES

Non-arcing. Extra capacity. No weak parts to wear.

A HEADLIGHT PACKAGE—consisting of two Headlights (specify voltage desired), one headlight Resistor and one mercury tube Switch is available, as well as the individual items. Write for details.

Manufactured by GUYAN MACHINERY CO. LOGAN, W. VA.

Equipment News (*Continued*)



cause of their low per unit cost, says the firm, the new bits are intended to be thrown away when they are dulled. Available in 3 sizes, 1⅝, 1½ and 1⅜, the dust collecting bits are of the cross-type 5-hole design. They can be used interchangeably on the same ⅞-in steel with Le Roi's all-steel one-use bits. CRD 875 shim, also interchangeable for all three bit sizes, is used for easy bit removal. The new bits can be used with any type air leg or hand sinker drill that uses the dust collection principle. Carbide inserts of the bits are made of top quality tungsten, the firm adds.

PAINT SYSTEM—Development of a new spray painting system requiring no atomizing air has been announced by Lincoln Engineering Co., St. Louis, Mo. Hydraulic pressure alone atomizes the material in Lincoln's "No-Air" Dyna-Spray system. This simple, trouble-free method offers many advantages, according to the manufacturer. No heating of the material is required. Less material is used, it is noted, since the well-defined spray pattern puts the material where it belongs, cuts overspray and bounce-back. The Dyna-Spray method reduces the amount of material in the atmosphere and generally eliminates the need for extensive ventilation, and because no atomizing air is needed a smaller compressor can be used. Four different nozzles offer a variety of spray angles from 15 to 80 deg. The heavy-duty spray gun weighs only 12 ounces and has a trigger that can be locked in

The more you mechanize, the more you need this simplified lubrication plan

Any breakdown of big, modern equipment, like the continuous miner shown above, seriously interrupts production schedules. That's why the more you mechanize, the more economical it is to adopt a Texaco Simplified Lubrication Plan. Often as few as 3 or 4 lubricants are all that's needed. That, in itself, just about ends failures caused by using the wrong lubricant.

Planned lubrication schedules in every Texaco Simplified Lubrication Plan also make good maintenance practice easy. And equipment produces more continuously because proper top grade lubricants prevent the causes of breakdown.

For example, consider Texaco Regal Oil R & O for hydraulic systems. In many cases, changing to Texaco Regal Oil R & O hydraulic fluid has resulted in a service life *8 times longer*. That's because this quality hydraulic fluid resists oxidation, sludging and foaming, and prevents wear and rust—the best guarantee you can get for long-lasting and uninterrupted operation.

Find out exactly how a few Texaco lubricants can keep *your* equipment running efficiently without breakdown. Call the nearest of more than 2,000 Texaco Distributing Plants in all States, or write:

Texaco Inc., 135 East 42nd Street, New York 17, New York.

Tune In: Texaco Huntley-Brinkley Report, Mon.-Fri.-NBC-TV

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LUBRICATION IS A MAJOR FACTOR IN COST CONTROL
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

CATERPILLAR'S **No. 1** PROJECT

*PAYS OFF FOR YOU AGAIN**

New Cat Power Shift Transmission for D9 and D8 Tractors

CONTROL is mounted to the left of the operator. One selector lever eliminates gearshift, forward-reverse and flywheel clutch levers. The safety lever prevents accidental transmission engagement. The selector lever moves in a "U" path to various positions. To the left are three reverse speeds. To the right, three forward speeds. To change speed, simply move lever to the required position. To change travel direction, move lever to the opposite side. Changing speed and direction are as easy as that—without clutching—changes can be made while the machine is in motion under full load without loss of power or momentum.

HIGHER PRODUCTION PUSHLOADING: Power is quickly, easily adjusted to meet the demand. Shifting to higher gear boosts scraper out of cut quickly at higher speed. Speedy reverse quickly positions machine for next push.

HIGHER PRODUCTION BULLDOZING: As material builds up, Cat power shift transmission permits split-second shifting. There's a minimum of forward surge when the load is dropped. Instant reversing further slashes cycle time.

- **Shifts on-the-go under full load in a split-second!**
- **Changes speed, reverses direction with finger-tip control lever—and no clutching!**

The wraps are off—it's ready. After many years of research and on-the-job testing, Caterpillar now offers a revolutionary new drive for Cat D9 and D8 Tractors—power shift transmission. This new transmission—with an exclusive design—provides production highs never before possible with a track-type tractor. Here's why:

1. It combines for the *first* time the flexibility and anti-stall features of torque converter with the operating snap of direct drive. Because of its direct drive characteristics, it is more efficient than other power shifts.

2. With one control lever and no clutching, it reverses direction . . . changes speed . . . smoothly . . . under full load . . . in a fraction of a second.

Talk about productivity—the Cat power shift transmission delivers in a big way. Split-second on-the-go shifts give plenty of power in the highest gear possible. Shifting is so easy the operator just naturally gets more work out of the tractor. What's more, he gets it on the toughest, most demanding track-type jobs.

Besides the power shift transmission, you also have your choice of direct drive or torque converter in the D9 or D8. For complete facts on the new Cat power shift transmission see your Caterpillar Dealer. He's ready to explain in detail how it works, or to demonstrate its ruggedness . . . its ease of operation . . . its productivity. Name the date—he'll demonstrate!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

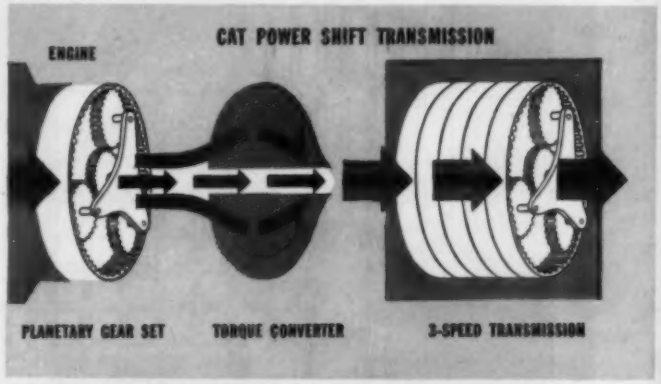
CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

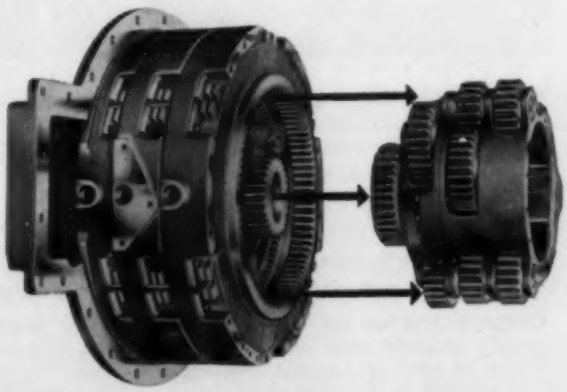
DIESEL ENGINES • TRACTORS • MOTOR GRADERS

EARTHMOVING EQUIPMENT

BORN OF RESEARCH
PROVED IN THE FIELD

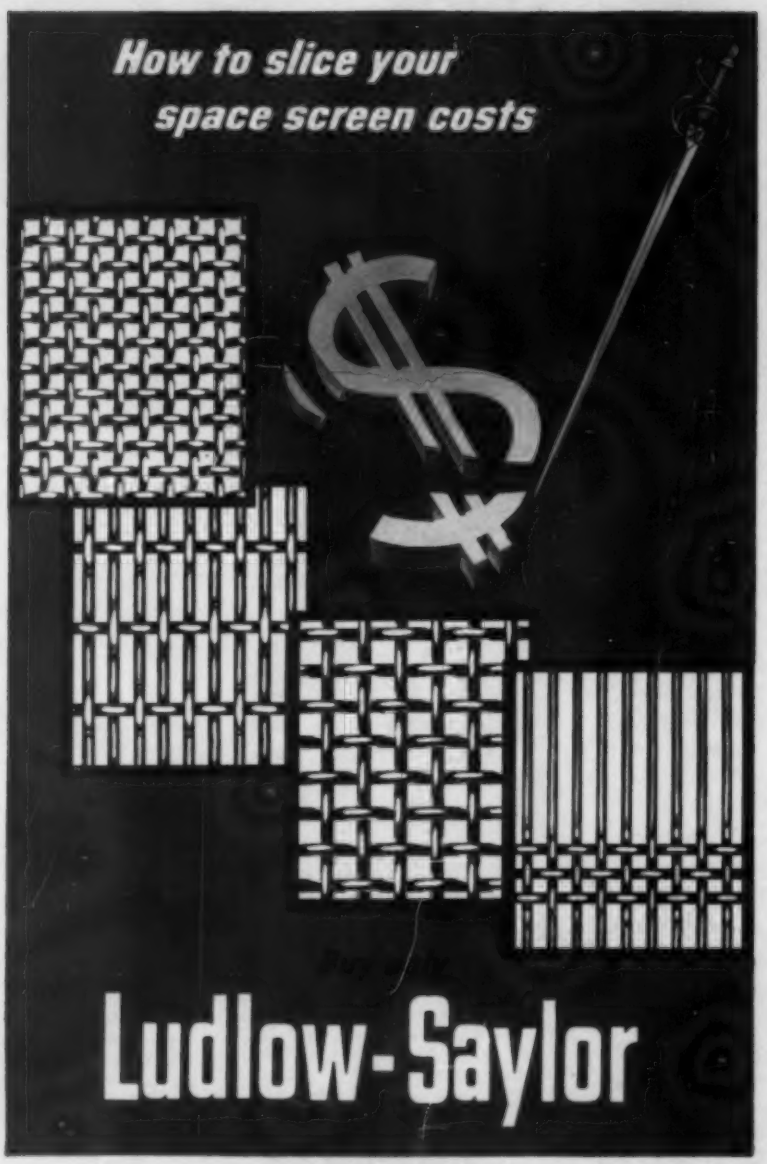


BASIC DESIGN: Total power is transmitted from the engine to a planetary gear arrangement mounted in the engine flywheel. The planetary divides and directs the total power—part goes through a direct drive shaft straight to the transmission and the remainder through a torque converter to the transmission. This enables the Cat power shift transmission to combine the snap and positive operating feel of direct drive with the anti-stall and flexibility features of torque converter drive. Its clean, unit construction design makes it easy to service, when required.



ONE TON OF RUGGEDNESS: Here's a portion of the components that make up the new Cat power shift transmission. Designed and built specifically by Caterpillar for its giant tractors, this rugged transmission weighs well over a ton. Every component is constructed for long-lived service. Selected alloy steel insures a transmission that stands up under the toughest conditions. Equally important, Cat power shift transmission comes to you thoroughly tested by exacting design and demanding field work in the heaviest earthmoving duty.

***CATERPILLAR'S NO. 1 PROJECT:** A multimillion-dollar research program—to meet the continuing challenge of the greatest construction era in history with the most productive earthmoving machines ever developed.



Cut replacement screen expense as much as half! These tougher L-S screens last up to twice as long as ordinary screens—have unbeatable resistance to abrasion, distortion, fatigue—promise these extra profit-making advantages:

- more efficient one-pass separation
- reduced plant-clogging recirculating loads
- faster feeds across the screen for increased output
- correction of variable crushing characteristics in raw materials

Order—Insist on—L-S Screens by name. Get a higher quality product with consistent uniformity *plus* the highest possible return on your investment in sizing equipment.

L-S Screens and Cloth can be furnished in any steel, stainless, aluminum, Monel, copper, brass or any other metal that can be drawn into wire.

Write for
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Immediate Shipment
of most weaves
and sizes

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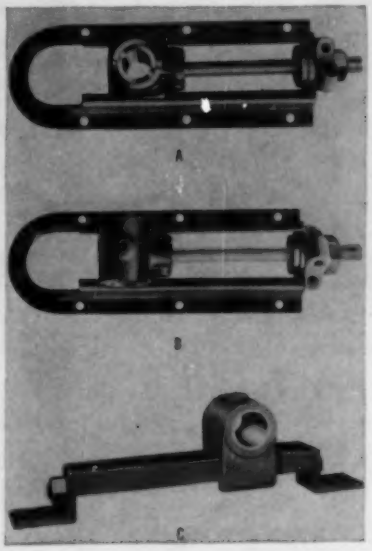
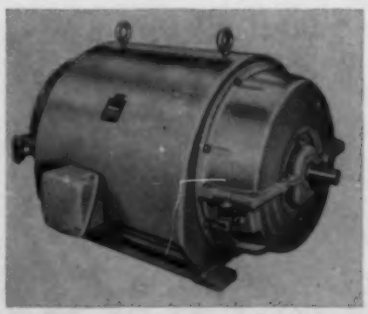
Equipment News (*Continued*)

open position for continuous spraying.



BEARING TAKEUPS—Link-Belt Co., Chicago 1, has announced the addition of 74 new sizes, in three new series, to its complete line of babbitted and bronze-bushed bearing takeups. With the additions, the firm now offers off-the-shelf delivery on more than 10 types and over 200 sizes of the bearing takeups for commercial shafting up to 5 5/16 in. The new sizes include: Series AS2600Z bronze bearing takeups for use on conveyors or elevators where service is moderate; Series BS 2700Z, with bearing blocks mounted parallel to the base of the frame, used generally on moderate duty conveyors and elevators; Series N3000Z bronze bearing takeups for use on moderate duty chain and belt conveyors or other special equipment.



INDUCTION MOTORS—The Louis Allis Co., Milwaukee 1, has announced a new line of large AC induction motors in open drip-proof enclosures in rating from 150 to 2,000 hp at 1,800 and 3,600 rpm. The firm declares that this is the most complete line of redesigned motors of this type now available and is intended for industrial applications

You can *expect* more from HENDRIX

...and *get* it!

HENDRIX
Heavy Duty **Mining Buckets**

Built for dependable heavy-duty service under all stripping conditions

4½ to 14 Cubic Yards With or Without Perforations

HENDRIX MANUFACTURING CO., Inc.
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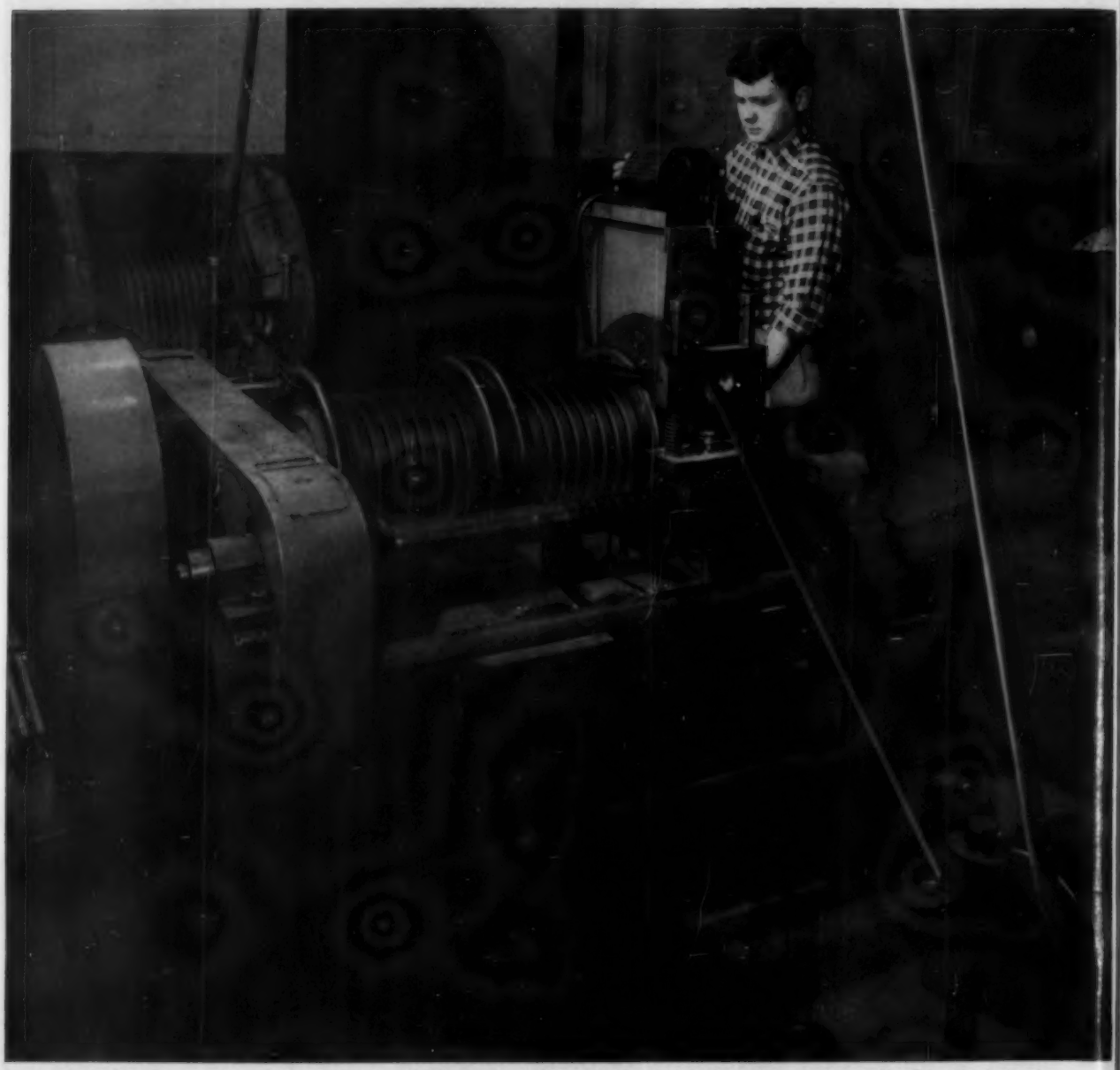
Hendrix DRAGLINE BUCKETS

HIGHER ARCH · WIDER FRONT · TAPERED BASKET · GREATER STRENGTH



Accelerated testing of cable. This machine, designed by AS&W engineers, is testing mining machine cable to determine its resistance to reeling and pay off under tension, abrasion, flexing under tension, kinking under tension. Just one of the ways to determine the best insulating and jacketing compounds.

From portable tools to the largest power shovels, Amerclad Cables offer safe dependable service.

It's how you mix ingredients in just the right proportions that makes a big difference in cable performance.

USS **Tiger Brand Electrical Wire & Cable**

A standard cable for every special job

- Asbestos Wire and Cable
- Mold-Cured Portable Cord
- Shovel & Dredge Cable
- Paper & Lead Cable
- Varnished Cambric Cable
- Interlocked Armor Cable
- Special Purpose Wire & Cable
- Aerial, Underground and Submarine Cable

What's the difference in electrical cable?

In USS Tiger Brand Amerclad it's better engineering and quality construction

Engineered for the job. USS Tiger Brand Amerclad Cables are used in such a variety of applications that "engineering for the job" becomes extremely important. Special constructions are designed for electric shovels, dredges, mining machines, welders and portable tools. Cable life depends on how well the engineers have anticipated all the destructive forces that a cable encounters in service.

Quality construction. USS Amerclad's highly flexible construction—rubber insulated conductors and Amerprene jacket—is carefully designed to give you superior electrical performance and mechanical reliability. Dynamically balanced rope lay conductors, as opposed to loosely bunched groups of fine wires, give balanced performance and long, trouble-free service through elimination of unequal tension and elongation.

Each conductor is separately insulated with Amerite, a tough heat-resisting, special rubber compound that exceeds the requirements of ASTM, and other industry standards. A rugged abrasion resisting Amerprene jacket protects the cable from mechanical abuse.

Tiger Brand Amerclad Cables are as tough as they come. They soak up shock and vibration, withstand crushing impact, severe jerking and pulling for unbelievably long periods. Used outdoors for mining, quarrying and excavating machines, Amerclad resists the constant wear and abuse from contact with rocky ground. And installed on lighter indoor equipment—electric welders, shop tools and motor leads—Amerclad gives top performance even when it's dragged over rough floors, through oil, grease or water.

Amerclad's greater durability will pay for itself many times in unfailing service, and ability to handle rated loads. It's the toughest electrical cord and cable money can buy.

Send for catalog. The Tiger Brand Amerclad Cable story is told completely in our new book we've reserved for you. We'll send the book without cost or obligation. American Steel & Wire, Dept. 9291, 614 Superior Avenue, N.W., Cleveland 13, Ohio.

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Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

Bucyrus-Erie buckets have

LOADING SPEED built in!

In high-speed Bucyrus-Erie buckets, weight is concentrated to help teeth, cutting edge, and thin "slicing action" lip penetrate swiftly. Material flows in easily because the bucket is tapered properly.

Bucyrus-Erie buckets swing smoothly through the carry without bobbing and spilling because they're properly flared and balanced. The high arch and smooth inside design assure clean, fast dumping.

For better bucket production, see your Bucyrus-Erie distributor or representative, or write Bucyrus-Erie Company, South Milwaukee, Wis., Dept. 4RA.

BUCYRUS ERIE®

BUILDS BETTER EQUIPMENT

Equipment News (*Continued*)

requiring higher horsepower constant speed motors. These motors serve as drives for pumps, fans, blower and compressors. Inspection and maintenance of the motors' capsule-type sleeve bearing bracket and split bearing is easy. Of special note is the use of bronze inserts in the bearing capsule to achieve close tolerance running fits between capsule and shaft, says the firm. Pressure lubrication is standard with large AC motors and is optional with smaller slower-speed motors.

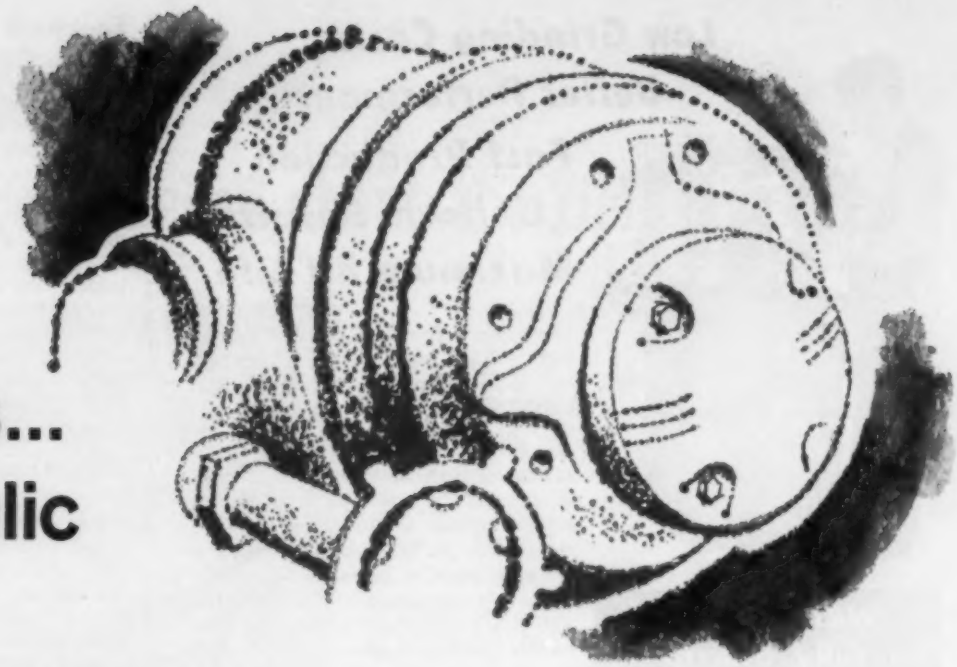
TOUGH TIRE—United States Rubber Co. has developed a unique truck tire that will take the rugged jarring impacts of off-the-road terrain and still withstand the searing heat and wear generated by highway speeds with heavy loads, reports the firm. The new tire is called an "industry first" by the company and reportedly will mean reduced costs for truckers by cutting sharply the down time from tire failures and subsequent repairs. Truckers can also save through reduced tire inventories and can get more retreads from each tire, it is added. The tire gets durability from a combination of double-strength nylon tire cord and tough steel cable. Multiple plies of the nylon cord are used in the carcass of the tire to protect against breaks and blowouts. Two layers of tough steel cable are used under the tread to protect against cuts and ruptures in the vital areas.

REPAIRING PIPE—The Marmon Div. of Aeroquip Corp., Jackson, Mich., has announced an improved heavy-duty Patchmaster pipe repair clamp. Made for pipe sizes from ½ through 8 in and in widths of 3, 6, 9 and 12 in, the Patchmaster easily and quickly repairs pipe leaks, says the firm. New lug design permits the pipe repair clamp to conform to the contour of the pipe under high torque without biting into the pipe. A Buna N pad will withstand high clamping pressures without extruding and is adaptable to oil, gas, water and steam, declares the firm.

Equipment Shorts

Smaller Relay—A sensitive smaller sized "Hydrogen Arc-Quenched" mercury timer relay has been announced by Durakook, Inc., Elkhart, Ind. The firm reports the timer relay will operate on about half the current of former models with greater sensitivity and longer operating life.

Hose Fittings—New push-type hose



Pumps... hydraulic oil... and profits

Faulty hydraulic pumps cut production. Rust, varnish and sludge interfere with precise control—in many cases bring a production line to a dead stop and whittle profits. Special inhibitors in Sinclair Duro Hydraulic Oils have earned the reputation for protection against varnish and sludge. Furthermore, Duro's rust inhibitor has a preferential metal-wetting action that forms a tough barrier against water penetration. Next time management asks how you've cut costs, tell them you've switched to Sinclair Duro...and show them the results.

Call your **Sinclair Representative** for further information, or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y.

Sinclair

Sinclair
Duro Hydraulic Oils

Low Grinding Costs
Better Performance
Fast Production
Uniform Results
Maximum Bit Life

These are a few of the many advantages you get when you grind your bits automatically on the FAIRVIEW BIT GRINDER.

All of these advantages boil down to savings of both labor and wheels, productivity of 250 to 350 per hour, correct angles—smooth finish, more regrinds, more grinds per bit, more tons per grind and elimination of hazardous operation. It's to your advantage to use the FAIRVIEW BIT GRINDER both in the satisfactory grinding results obtained and in the protection of your investment in expensive equipment.

WRITE TODAY for fully descriptive bulletin!

FAIRVIEW BIT COMPANY
FAIRVIEW, WEST VIRGINIA

TRIAL SAMPLES
Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893
THE WHITMORE MANUFACTURING CO.
LUBRICATING ENGINEERS
CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

Equipment News (*Continued*)

fittings for air, water, oil and fuel service for work at pressures under 250 psi are available from Parker Fittings & Hose Div., Parker Hannifin Corp., Cleveland 12. These "Push-lok" fittings are brass with a plastic cap to fit over the end of the hose for neater appearance and to prevent capillary action of fluids in the reinforcement braid of the hose. The hose, No. 821 with fiber braid reinforcement or No. 831 with abrasion-resistant rubber cover, is pushed on over barbs on the stem of the fitting, gripping firmly, declares the firm.

Insulation—"Hyrad-FR," a new insulating material developed by Sequoia Wire & Cable Co., Redwood City, Cal., retains the excellent electrical properties of polyethylene but has greatly improved heat stability and cold flow resistance, plus flame retardance, reports the company. One outstanding feature of the material is its ability to withstand soldering without damage, permitting a circuit designer to take advantage of insulation with good electrical properties but still go through soldering operations, adds the firm.

Tinning—"Tin Swipe," a sponge impregnated with tinning metals, chemical cleaners and a flux, can be wiped across a heated metal surface and it will leave a smooth but complete coating of tin, reports Wright Mfg. Co., Cleveland 15. Just ordinary cleaning of the surface is needed before application. If a heavier coating of tin is desired a second swipe while the metal is still hot is sufficient.

Free Bulletins

Welding—A full line of arc welding machines is described and illustrated in a 24-p catalog from Hobart Bros. Co., Troy, Ohio. The book has specifications and ordering data on gasoline and diesel driven welders, electric motor driven arc welders, rectifier-type welders and others. Also included is information on induction heating equipment, pipe thawing units and a power source for cutting and gouging.

Filtering—Costs for filtering, different types of elements and other information in this field are covered in new Booklet DE928 put out by Caterpillar Tractor Co., Peoria, Ill.

Motors—Imperial Electric Co., Akron 9, Ohio, has just published a comprehensive booklet on its line of motors and generators, AC and DC. Included are squirrel-cage AC motors, special purpose motors, wound-rotor motors, and other

Questions

We've been asked about the Yieldable Arch

"The Yieldable Arch weighs only 15 lb per foot. Isn't that like sending a boy to do a man's work?"

Strength alone is not the key to the Yieldable Arch's success. It is the "give," or yielding action, which keeps the ground under control as explained in the answer at upper right. If for some reason the joints failed to slide, then the Arch would become, in effect, a rigid set. This is why it is so important that the U-clamp bolts in the joints be tightened only to the proper tightness, and no more.

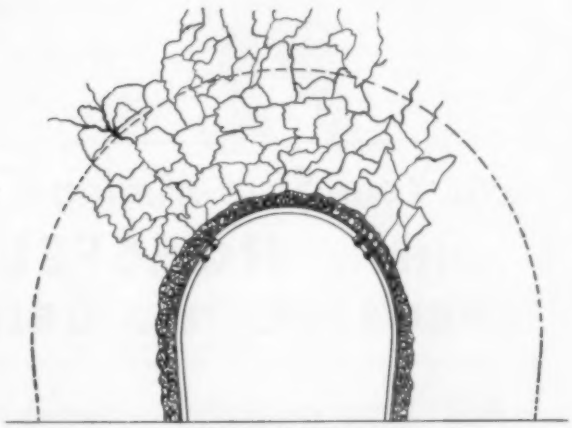
SEND US YOUR QUESTIONS

If you have any questions whatever, about the Yieldable Arch, or Ring, or ground control problems, by all means send them in. We will study your problems carefully, and reply as promptly as possible. Write to Room 1041, at the address below.

"Why does the Yieldable Arch perform better than rigid supports?"

The idea of a yieldable support is to let the ground slowly form its own natural arch. By yielding, the Arch transfers the weight back to the ground. When a natural arch has been formed, it then carries the major share of the load.

Rigid supports cannot return the pressures uniformly to the ground. Thus, no matter how heavy or husky they may be, rigid sets will ultimately fail in moving ground. And, of course, they impose continual maintenance problems.



YIELDABLE ARCHES MUST ABSORB RELAXATION UNTIL NATURAL ARCH IS FORMED.

"Suppose Yieldable sets should deform for some reason. Can they be salvaged?"

Frequently a deformed set can be re-shaped and restored to service. We know of one mine in the West which has had notable success in salvaging arch sets by first heating the segments, then straightening them under a large air hammer.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Equipment News (*Continued*)

types, many of which are illustrated. Motor ranges run from 1 to 200 hp, motor-generators from ½ to 150 kw.

Earthmovers—New International Model 495 Payscraper and Model 495 Paywagon are detailed in a 36-p catalog just released by International Harvester Co., Chicago 1. New features of the Payscraper include 34-cu-yd heaped and 24-yd struck capacities, a 375-hp IH diesel engine and advance lift-frame design. The 495 Paywagon has a heaped capacity of 40.5 cu yd and a struck capacity of 27 yd.

Tractor Shovels — In a new 8-p catalog, Allis-Chalmers Mfg. Co., Milwaukee 1, describes the HD-16G and HD-21G torque converter drive tractor shovels. Text matter describing the production-boosting features of both units is accompanied by numerous illustrations. Specifications are included.

Metalspraying — An illustrated data sheet describing the Colmonoy C-290 crankshaft metalspray powder is available from Wall Colmonoy Corp., Detroit 3, Mich. The sheet discusses physical properties and characteristics of the patented material and illustrates some of the steps in its application.

Compressed Air—Ingersoll-Rand Co., New York 4, has just published a booklet entitled "Compressed Air Fundamentals." It is designed to help anyone in the selection of a small "packaged" air compressor for either automotive or industrial application. Also included is information on compressor oils, pipe sizes, wire sizes and terminology and definitions used in connection with air compression.

Automation—Push-button coal cleaning in one of the largest automated plants of its type in the world is shown in a new 16-mm motion picture, "Preparation Makes The Product," put out by Link-Belt Co., Chicago 1. The new plant of the Clinchfield Coal Co., Div. of The Pittston Co., has a capacity of 1,500 tph. The film runs 19 min.

Air Drill—A new bulletin describing the Model M-8TA tractor-mounted rotary air drill is out from Davey Compressor Co., Kent, Ohio. Contents include complete drill specifications, mechanical data and numerous illustrations. Rated capacity of the M-8TA with 6-in drill bit is 600 ft in fair to good sedimentary rock formations with 3½-in diameter drill pipe.

Mine System—A new mine fan and circuit breaker monitoring and control system is fully explained in Bulletin 5902 from Femco, Inc., Irwin, Pa. The "809" system provides automatic shut-off for all mine power in event of ventilation system failure. In addition it monitors all fans and circuit breakers and provides centralized remote control for circuit breakers.

Bits — Carbide-tipped bits for every type of mechanized coal mining equipment are covered in a new catalog issued by Vascoloy-Ramet Corp., Waukegan, Ill. Complete dimensional data on the entire V-R Red Bit line has been included to help you select the proper bit sizes and styles for your equipment, says the company.

Flexible Couplings—A recently revised bulletin on roller chain flexible couplings has been put out by Chain Belt Co., Milwaukee 1. It outlines the advantages that are gotten from flexible couplings including: simple all-steel construction for long life; accommodation of angular and parallel misalignments with minimum backlash; and easy installation or removal. How to select Rex flexible couplings is another subject handled.

Product Line—Catalogs are available from U. S. Rubber Co., New York 20, on a wide variety of products. Catalog 381 handles UscoFlow HT plastic pipe and fittings; Catalog 758 discusses expansion joints; No. 199 is all about U.S. Rubber flexible couplings; and No. 399 handles rubber pinch valves, their advantages and applications. All of these colorful booklets and many others, most of which are illustrated, are available free from the company upon request.

Tools—A guide showing the best-suited handling tool fittings for high-voltage power fuses, cutouts, switches, and load interrupters is featured in a new Bulletin just released by S&C Electric Co., Chicago 40. The 12-p book illustrates and describes the function and construction of 15 basic tools for utility, industrial plant and commercial building interrupting equipment.

Filter — Dorr-Oliver, Inc., Stamford, Conn., announces the availability of a new bulletin entitled "The American Filter." The booklet describes the design, operation and advantages of this disc-type filter for metallurgical, chemicals, and industrial processing. Also included are line and wash drawings and photographs of the unit, its components and several operating installations.

Submersible Pumps—Layne & Bowler, Inc., Memphis 8, Tenn., has released an informative bulletin entitled "Submersible Pumps". Detailed cross section drawings plus colored illustrations of many and varied uses and applications of the pumps make up the bulletin.

Cut Your Strip Mining Costs with a **HOSSFELD PROSPECTING DRILL**

ACTUAL field runs prove that prospecting costs can be cut with this fast working machine due to its many economical working features and quick setup time. Samples are taken continuously while drilling to accurately determine type of formation, and depth of vein or ore body, up to 110 feet deep.

- POWERFUL DIRECT DRIVE
- ONE MAN OPERATION
- ECONOMICAL 5 H. P. GASOLINE ENGINE, AIR COOLED
- LIGHT WEIGHT — COMPACT — PORTABLE

Designed to fold into a half-ton pickup, trailed in the field on its own chassis, or dismantled for easy packing over rugged terrain.

WRITE TODAY . . . for illustrated bulletin "Take the guesswork out of Mining"

HOSSFELD MFG. CO.
440 W. 3rd Street, Winona, Minnesota

freezeproof... with Ashland **Permatreat** Coal Spray Oil!

(1) FREEZEPROOF. Coal sprayed with Permatreat resists freezing, eliminates frozen car pockets and becomes weatherproof, dustproof, waterproof, windproof and non-corrosive.

(2) REFINERY-CONTROLLED QUALITY. With Ashland Permatreat, you're assured of product uniformity. Permatreat is quality controlled and carefully refined to meet the needs of your operation.

(3) TECHNICAL AND RESEARCH SERVICE. Helpful technical and research services are available from our nationally recognized specialists in oil treating of coal.

(4) CONVENIENT SUPPLY POINTS. Large, dependable storage facilities located near the coal fields assure uninterrupted supplies of Permatreat for immediate delivery by transport truck or tank car.

ONE **Permatreat**MENT LASTS THE LIFE OF THE COAL!

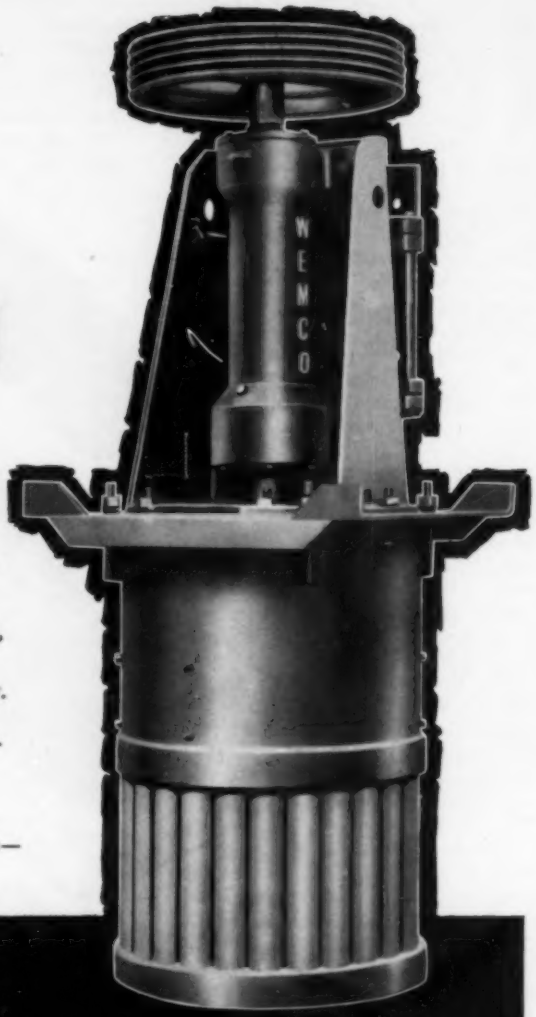
For immediate service call any of these convenient Ashland Oil offices.

Ashland Ky., EAst 4-1111
Beckley, W. Va., CLifford 3-6687
Canton, O., GReenwood 7-4565
Columbus, O., AMherst 8-9419
Kuttawa, Ky., Phone 5501
Louisville, Ky., SPring 6-4631
Pittsburgh, Pa., FRemont 1-7314

Ashland PERMATREAT

ASHLAND OIL & REFINING COMPANY, Ashland, Kentucky

THIS DECISION WILL PAY BONUS PROFITS OF MORE THAN $6,500 EVERY DAY!



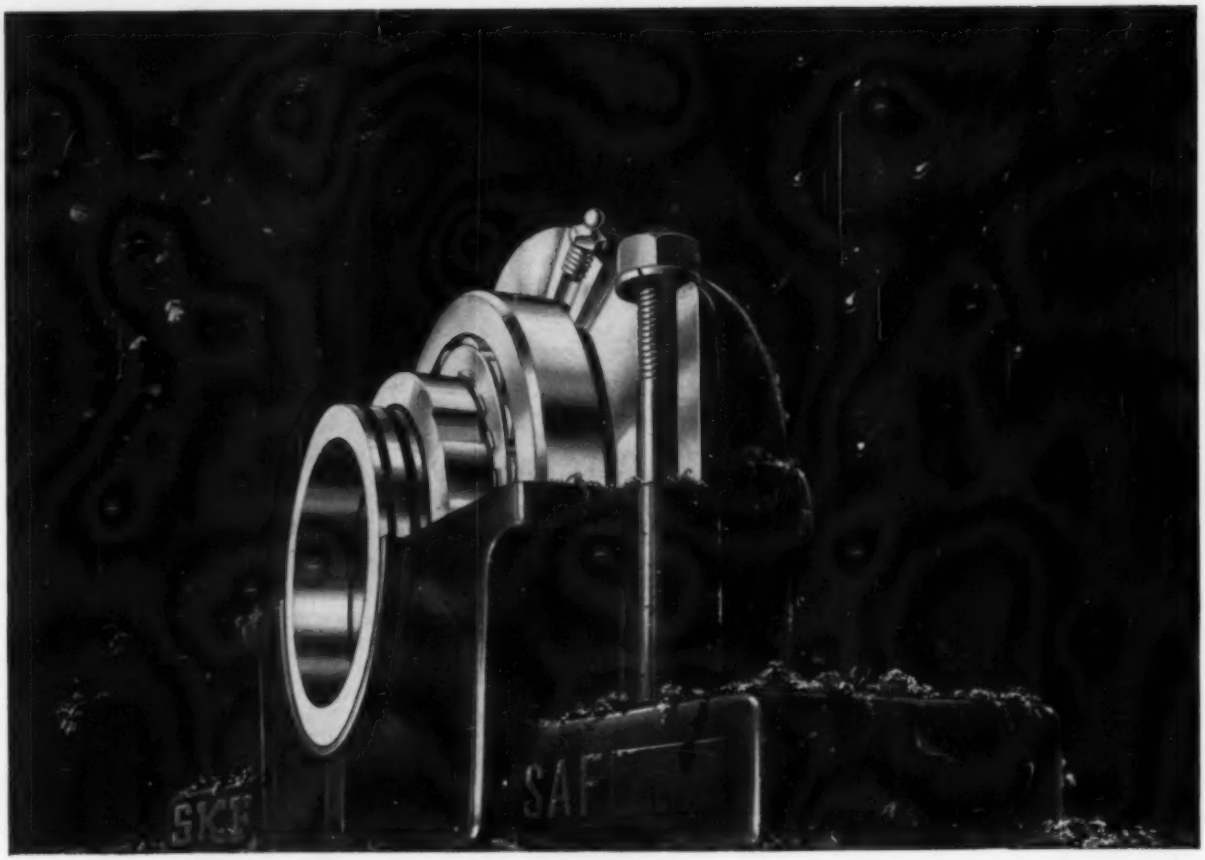
This order and installation of Wemco-Fagergren Flotation Machines by a leading coal producer will result in additional profits of over *$6500 per working day*— and for surprisingly low capital investment. Cost of the total plant addition, including the flotation cells, will be offset in less than four months.

This is another example of how Fags go to work—profitably. Recovery is consistently higher; floor space, maintenance and operating labor, reagent and other requirements are less.

The Wemco-Fagergren record of profit-producing installations tells the story of sound experience. The men of Wemco will be glad to furnish all the facts and discuss why Wemco-Fagergren Flotation will do a better job—where flotation has a place.

WEMCO®

a division of
Western Machinery Company, 650 Fifth St., San Francisco, Calif.
and throughout the world



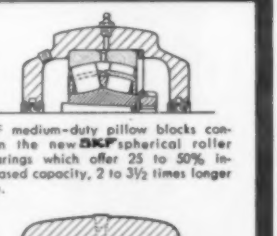
SKF Triple Seal provides best possible protection

The SKF Triple Seal is a heavy duty, general purpose seal designed for use with oil or grease lubrication. It was developed by SKF to protect the bearing from foreign materials while providing an effective barrier against lubricant leakage.

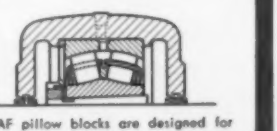
The bearings in all SKF split pillow blocks are protected by triple seal rotating rings. The seals are triple lipped and are one integral unit. They are mounted with a slip fit on the shaft which permits unrestricted axial motion. Being of the labyrinth type, there is no friction between the rotating and stationary components; consequently, there is no wear and no replacement problem.

SKF Triple Seal Type SAF pillow blocks, with ball or roller bearings, give long trouble-free service. If your design involves abnormal operating conditions, cast steel housings (designated SAFS and SDAFS) are available. These heavy-duty pillow blocks are recommended for use in oil field machinery, steel and rubber mills, crushers, etc.

Standard type SAF split pillow blocks are available for ¾" to 10½" dia. shafts, and Type SDAF for 2 11/16" to 14" in adapter type mounting. Direct shaft mounting available for shaft shoulders up to 9 7/16" and shaft extensions up to 8 5/16". For data on both designs, send for Catalog 390.



SAF medium-duty pillow blocks contain the new SKF spherical roller bearings which offer 25 to 50% increased capacity, 2 to 3½ times longer life.



SDAF pillow blocks are designed for heavy-duty applications and also contain the new SKF spherical roller bearings.

5917

Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

® REG. U. S. PAT. OFF.

Among The Manufacturers

R. T. Hair has been named vice president, technical services, for the Coal Machinery Div. of Joy Mfg. Co.

Mr. Hair was formerly general sales manager of the Coal Machinery Div. He has been with Joy since 1943 in various engineering, sales and service positions.

Edward C. Buurma, formerly manager of product development of Sequoia Wire & Cable Co., has been transferred to the parent company, Anaconda Wire & Cable Co.

He will be active in promotional sales work related to the defense program.

Three promotions at the General Tire & Rubber Co. have been announced.

Kenneth M. Smith has been named to the position of manager of truck tire sales for the Akron Div. **Albert W. Elliott** is the new manager of special purpose tire sales, Denver Div., and **Robert I. Black** has been named to the spot of manager, special purpose tire sales, for the Chicago and Twin Cities Divs.

George E. Bowling has been promoted to manager of special purpose tire sales, Cincinnati and Memphis Divs., for the General Tire & Rubber Co.

J. E. Sheets is the new eastern sales manager for LeTourneau-Westinghouse Co.

Sheets

The appointment puts him in charge of operations in 22 states and 5 Canadian provinces. He succeeds D. H. Mitchell, who recently resigned the position. Mr. Sheets entered the construction equipment field in 1951 when he became an industrial engineer for L-W. Educated at the University of Illinois, he is married and has 2 children, making his home in Washington, D. C.

Arthur E. Shannon has joined the Lee-Norse Co. sales organization and will be in charge of the Tri-State area including Pennsylvania, northern West Virginia and eastern Ohio.

Shannon

Mr. Shannon, who will make his headquarters in Charleroi, Pa., is replacing the deceased Edward Phillips. He comes to the Lee-Norse organization with many years of experience as a mining equipment salesman in the Tri-State area.

H. J. Gisler has been appointed manager of the Eastern Sales Div. for Denver Equipment Co., leaving the post of chief metallurgist which he has held for the past 15 yr.

Gisler

Mr. Gisler, who has been with the company since 1937, assumes sales responsibility for the area including the Pennsylvania and West Virginia coal fields. He will also be in charge of the paper D-Inking Equipment Div. Denver Equipment Co. makes

HARRISON

ATTACHABLE CABLE COUPLERS

PERMISSIBLE and FRESH AIR (INTERCHANGEABLE)

POWER SOURCE

Cable—50-60% Ground Wire Type G, PG, Twin G

Type PCG—Control Amperes as used in conventional control circuit

See Catalog #659 C

POWER ENTRY TO MACHINE

PERMISSIBILITY

(Bureau of mines approval 2-1222) Achieved by type D coupling with approval plate.

Explosion tested, locked, and meter sealed.

Pilot circuitry *not necessary* to secure permissibility.

Change from Type C fresh air coupling to Type D permissible coupling on same male and female bodies.

Water tight throughout. All metal parts non-corrosive bronze or stainless steel.

Low resistance pins/sockets and terminals are integral for cool operation. Neoprene wiring chamber boots are easily threaded on. D.C. or A.C. with or without pilot pins. Wire sizes #8 to #750 MCM.

FROM POWER SOURCE TO POWER USE

Write for BRAD HARRISON CO. CATALOG No. 659C

4222 WARREN AVE. • HILLSIDE, ILLINOIS • Phone LINDEN 4-2800

Morrison-Knudsen Company, Inc., employs M-R-S Model 250 Tractors and Model 250 HW 40 cu. yd., struck—50 yd. heaped—Scrapers on this dam project in Leesburg, Ala. Morrison-Knudsen recently purchased 4 of the R-1550 ROADRANGER-equipped M-R-S Tractor-Scrapers and a 5th Model 250 Tractor used primarily for powering compaction rollers—the company's 3rd purchase of M-R-S 250 combinations in a year. The recent purchase brings the total for the Leesburg job to *eight* M-R-S 250 Scraper combinations and *two* M-R-S 250 Compaction Tractors.

Geared by ***FULLER*** . . .

50 YARDS, heaped, with R-1550 ROADRANGER

This M-R-S Model 250 Tractor employs a 600 hp diesel engine and a semi-automatic 9-speed Fuller R-1550 ROADRANGER Transmission to pull an M-R-S 250 HW Scraper with a heaped capacity of *50 cubic yards*.

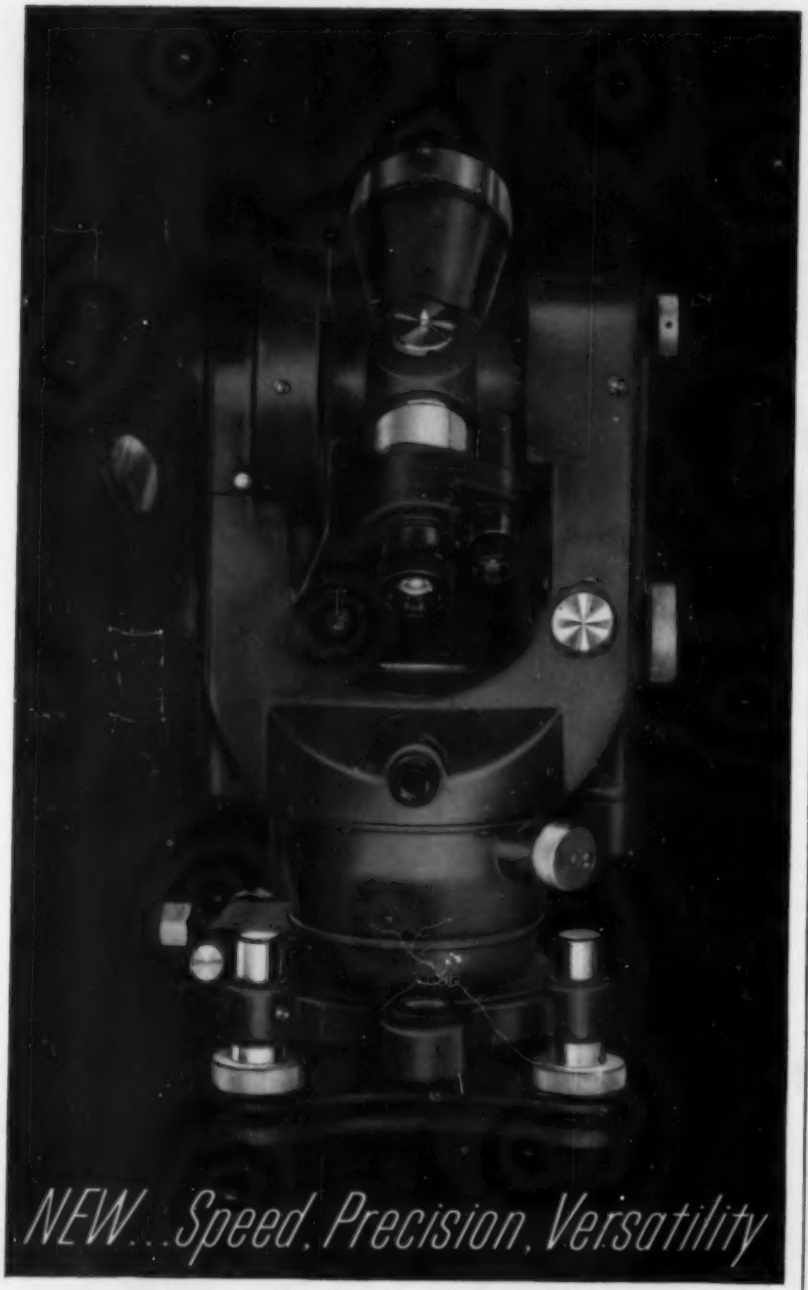
Standard equipment on the huge tractor, the R-1550 ROADRANGER features nine forward and two reverse speeds, selected with a single shift lever. With short, even steps—averaging 38% — between forward ratios, the engine can work in the peak hp range at all times, resulting in fast, economical scraper operation.

The Fuller Air-Powered Countershaft Inertia Brake on the R-1550 ROADRANGER permits quick, easy up shifts without double clutching, and the Fuller Pressure Filtration and Lubrication System provides positive lubrication, maintains clean gear oil and prolongs gear and bearing life.

For faster work cycles, lower fuel consumption, longer engine life, less operator fatigue, GREATER PROFITS . . . specify Fuller Transmissions.

FULLER — TRANSMISSION DIVISION — MANUFACTURING COMPANY
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla. Automotive Products Company, Ltd., Brock House, Langham Street, London W.1, England, European Representative



WILD T-1A OPTICAL REPEATING TRANSIT

All the ruggedness, simplicity, and trouble-free performance of the world renowned T-1...plus the convenience and extra speed of automatic vertical collimation setting.

Vertical angles can be read immediately after set-up. No need to center vertical circle level...no cleaning or maintaining moving parts.

Highway, mining, or any other surveying project, day or underground, becomes routine with the Wild T-1A.

Upper and lower motions for setting on zero and for repeating. Built-in optical plummet.

Write for Wild Booklet T-1A.

In Canada: Wild of Canada Ltd., 157 Maclaren St., Ottawa, Ontario

WILD
HEERBRUGG
INSTRUMENTS, INC.

mineral processing equipment and water treatment and clarification equipment.

Goodman Mfg. Co. has opened a new warehouse at West Frankfort, Ill., for the convenience of mines in southern Illinois, Indiana and western Kentucky.

This completely stocked outlet of renewal parts for Goodman machinery is under the supervision of Roy Soper, supply manager for the area, who is assisted by Ward Carlson, factory trained for the post of Warehouse manager.

George W. Boulter, named assistant manager of the Mining Div. of Marion Power Shovel Co., was formerly safety director of the Montana State Highway Dept.

Boulter

A registered professional engineer, Mr. Boulter has over 20 yr experience in various operating capacities in the non-ferrous metal mining industry. He was at one time an applications engineer for Joy Mfg. Co. and Eimco Corp.

For the Trojan Div. of The Yale & Towne Mfg. Co., R. J. Lyons Sr., has been chosen Trojan tractor shovel district sales representative in New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, Kentucky, Ohio and southern New York.

Robert C. Peterson will serve in a similar capacity in Montana, Wyoming, Idaho, Utah, Colorado, New Mexico, Arizona and Saskatchewan in Canada.

The Okonite Co., subsidiary of Kennecott Copper Corp., has announced several new appointments within its marketing division.

C. D. Ham, formerly sales manager, has been named manager—plans, programs, new and special products. **H. N. Bush** has been named factory sales manager of rubber, plastic and varnished cambric cable products. And **Ray J. Wynne**, formerly with splicing materials sales, has been promoted to manager, Tape Dept.

Ralph W. Stambaugh was named eastern regional conveyor belt engineer for United States Rubber Co., leaving his post as district sales manager, Pittsburgh branch.

Delwood C. Lee, formerly district sales manager at New Orleans will fill Mr. Stambaugh's old post and **John M. McCarthy**, assistant district sales manager at the firm's Los Angeles branch, has been named to Mr. Lee's former New Orleans position.

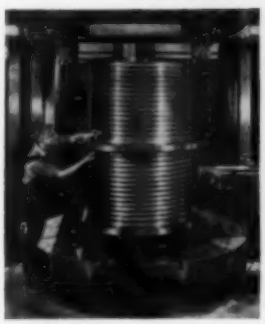
Where your profits are concerned...there is

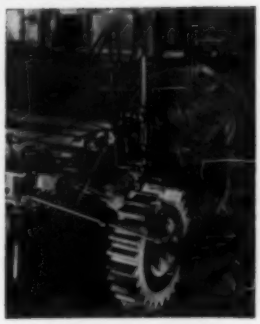
No Second Best Quality!

Bucyrus-Erie is *very* interested in the detailed production records you maintain on the machines in your pits. The reason: Bucyrus-Erie wants to be sure that the parts you buy for your equipment are *more than satisfactory.*

In one of the most extensive laboratories in the Industry, Bucyrus-Erie engineers and technicians constantly check and recheck, test and torture materials used in your machine parts.

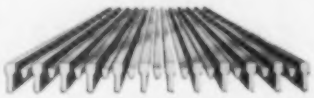
That is why BECO PARTS last longer on the job, make the production records of Bucyrus-Erie machines better. We have a big stake in your operations. When you buy parts...buy original equipment BECO PARTS for new machine performance!





BUCYRUS ERIE ®

T-WEDGE KLEENSLOT



A new concept in guard bar design. T-shaped wire replaces typical "bar" to increase screening surface while keeping large unscreenable lumps of material above the tolerance governing lower screening surface.

F217 and F250 KLEENSLOT

Manufactured with large size wedge shaped wires to maintain maximum efficiency over an extended period in abrasive applications.

Although large in wire size, this screen will easily maintain openings as close as 1 m.m.

G187 and GB187 MIGH-TEE KLEENSLOT

Special profile increases wearing surface. This is a heavy duty precision type screen that will easily maintain openings smaller than ⅛ m.m. and openings larger than ordinarily considered economical.

"S" KLEENSLOT

Engineered for applications where screening out of flats or slivers is of prime consideration. Can be also furnished in a "C" bend. Recommended for applications requiring openings larger than 1 m.m. For smaller openings, see Marcel screen.

MARCEL

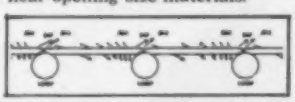
This screen, while screening out "slivers," presents a flat surface for materials to wipe the opening clean. Available with openings up to 1 m.m.—for larger openings see "S" screens.

SCREEN GUARD

Vertical guard bars keep larger unscreenable materials above the actual screening surface. This increases screen life and promotes much greater efficiency in dewatering.

TAPER-SLOT

From loop to loop, the screen opening gradually increases. This design is to eliminate blinding when screening large amounts of near-opening size materials.



For example: .016 opening tapered to .024—the combination of opening sizes would be the same between each loop throughout the entire screen.

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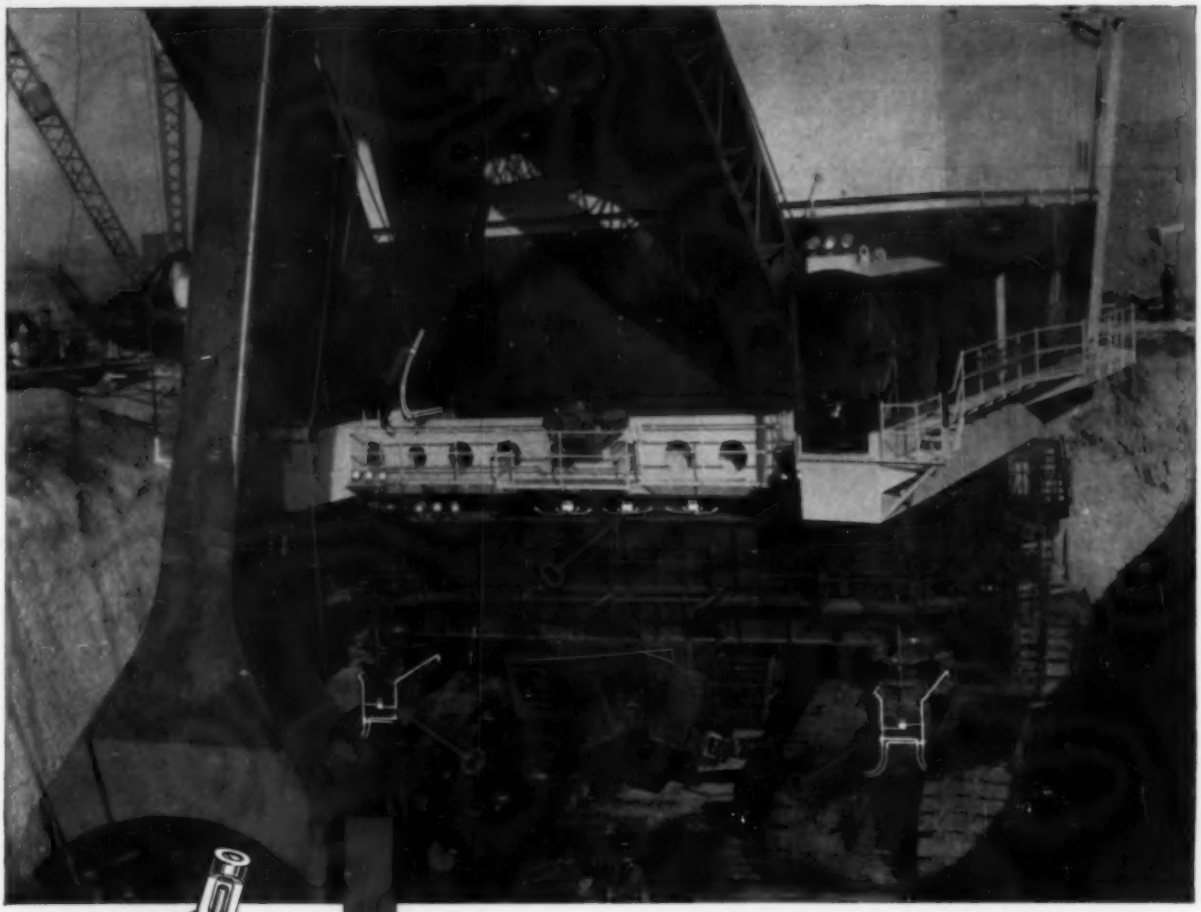

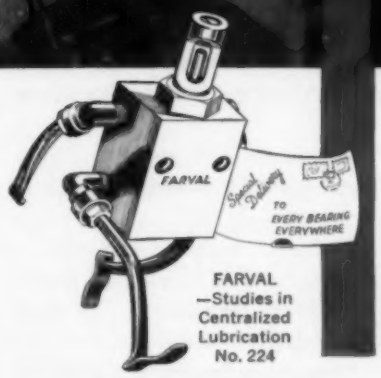

FARVAL
—Studies in Centralized Lubrication
No. 224

Farval handles lubrication requirements for shovel bearings under 6,000,000 pound load

On this Marion #5760 shovel in the Midland Collieries near Victoria, Illinois, some 6,000,000 pounds rest on eight crawlers. The constant, positive lubrication required at the shovel's 336 undercarriage points is provided by a Farval air-operated system.

Another Farval system serves 115 roller circle bearings and 12 center pin thrust points through a system which can be disconnected as the points rotate.

A critical group of 33 points which move in a 165° arc and 58 other points on the huge shovel are similarly protected by modern Farval lubrication systems.

Where load pressures are high, where flexibility is required, and where lubrication without downtime is desired, Farval systems are the answer. Write today for revised Bulletin 26-S, The Farval Corporation, 3288 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

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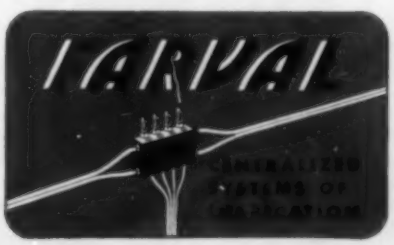
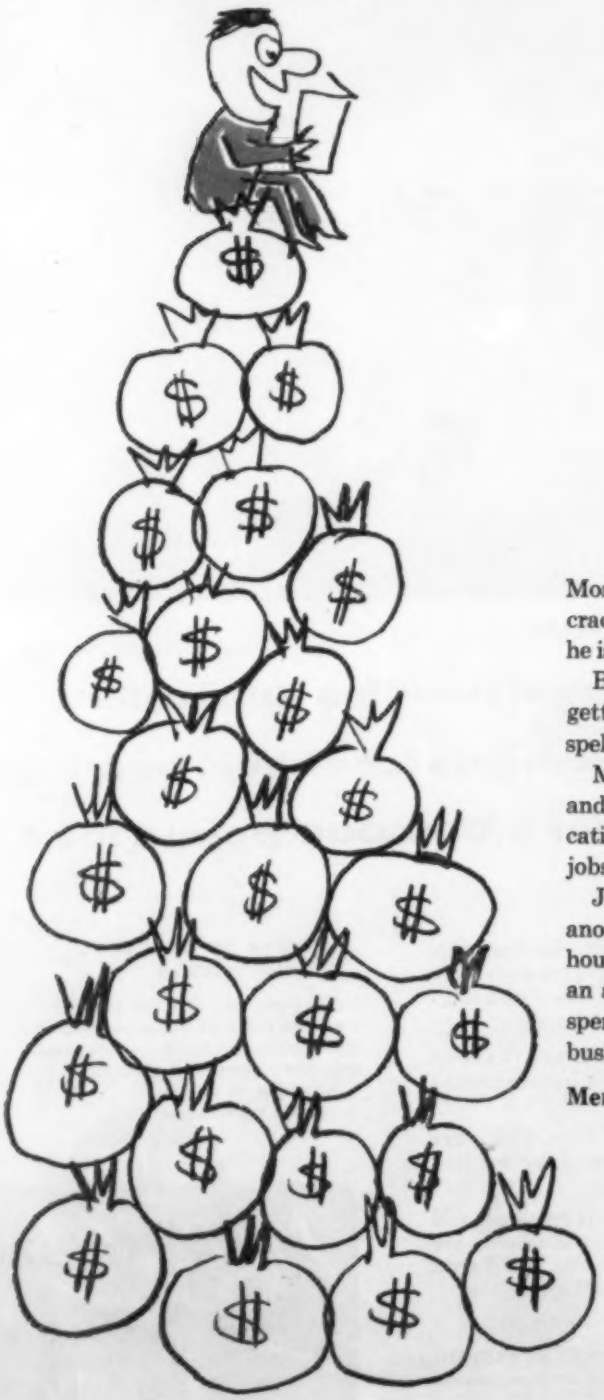
Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated.



Men who read more ...earn more!



Most of us recall at least one classmate who "never cracked a book", but somehow got by. Wonder where he is today?

Because today, in business and industry, "just getting by" isn't good enough. Sooner or later it spells defeat.

Men who "do crack a book", regularly and well . . . and particularly the McGraw-Hill specialized publication that is edited selfishly for them . . . do their jobs better, get ahead faster.

Just recently, for example, a fascinating study in another field showed that the men who invested five hours a week in reading business magazines earned an average of 75 percent more than those men who spent only an hour in reading. It makes sense in your business, too . . . doesn't it?

Men who read more . . . earn more!

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1. By switching to an ammonium nitrate-fuel oil mixture, you can substantially reduce the cost of explosives. (Ask a Bemis specialist about proper mixtures for your individual job.) **THAT'S ECONOMY**

2. You can get a full, solid pack in Bemis Explosives Bags . . . maximum explosive power in every hole. **THAT'S EFFICIENCY**

3. You can seal the poly liner with complete safety with the new Bemis "Tom Thumb" Heat Sealer. One man seals a bag in 5 to 6 seconds. No hazards. The cost? A modest $120.00.

THAT'S EFFICIENCY, CONVENIENCE AND ECONOMY

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THAT'S STILL MORE EFFICIENCY

Write or phone us for the complete story about Bemis Explosives Bags. A Bemis specialist will see you promptly.

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THE MAN WE MEAN IS A COMPOSITE of the editorial staff of this magazine. For, obviously, no one individual could ever accomplish such a vast business news job. It's the result of many qualified men of diversified and specialized talents.

AND, THERE'S ANOTHER SIDE TO THIS "COMPOSITE MAN," another complete news service which complements the editorial section of this magazine — the advertising pages. It's been said that in a business publication the editorial pages tell "how they do it" — "they" being all the industry's front line of innovators and improvers—and the advertising pages tell "with what." Each issue unfolds an industrial exposition before you — giving a ready panorama of up-to-date tools, materials, equipment.

SUCH A "MAN" IS ON YOUR PAYROLL. Be sure to "listen" regularly and carefully to the practical business information he gathers.

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5480 Marion 18 Yd. Elec. H. L. Shovel
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4161 Marion 6 Yd. Elec. Shovel
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120-B Bucyrus Erie 4 Yd. Elec. Shovel
4500 Manitowoc 5 Yd. H. L. Shovel
111-M Marion Standard & H. L. Shovels
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Searchlight Equipment Locating Service, c/o COAL AGE
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Your requirements will be brought promptly to the attention of the equipment dealers advertising in this section. You will receive replies directly from them.

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c/o COAL AGE
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City ..... Zone .... State .....

10/59

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5—3ZE Joy Shuttle Cars
1—3ZD Joy Shuttle Car
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1—14BU-7BE Joy Loader, Rebuilt
6—14BU-2E Joy Loaders, 28" O.H.
5—12BU-9E & 7E Joy Loaders
4—8BU Joy Loaders, A.C. & D.C.
2—20BUI-3E Joy Loaders
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1—T2-2 Joy Machine Truck
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1—Lee Norse Continuous Miner
1—210 cu. ft. Acme Air Compressor
2—125 cu. ft. Acme Air Compressors
8—Manson Jeeps w/9J Motors

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1—48" x 963' Link Belt, Belt Conveyor, w/100 h.p. Drive
1,072'—36" 6AA or B Jeffrey Belt Conveyor Structure
1,068'—36" Model "C" Joy Belt Conveyor Structure
3—36" Model "C" Joy Belt Conveyor Drives
1—36" x 2,500' Jeffrey 52B Belt Conveyor w/25 h.p. Tandem Drive
1—36" x 800' Goodman 97HC Belt Conveyor w/30 h.p. Tandem Drive
4—30" x 1,000' Goodman 99-5GT Belt Conveyors w/40 h.p. Tandem Drives
2—30" Goodman 99-5GT Tandem Belt Conveyor Drives, 40 h.p.
2—30" Joy MTB Tandem Belt Conveyor Drives, 25 h.p.
2—30" Goodman 97HC Tandem Belt Conveyor Drives, 30 h.p.
1—30" Shop Constructed Belt Conveyor Drive, 15 h.p.
673'—30" Barber Greene Belt Conveyor Structure
2—26" Jeffrey 52B Belt Conveyors, 1,000' centers
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1—26" x 2,450' Joy MTB Belt Conveyor, w/25 h.p. Tandem Drive
19,424'—26" Joy Model "C" Belt Conveyor Structure
18—26" Belt Conveyor Drives of various types
36—Tipple Belt Conveyors, various widths and lengths

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4—15" Joy Chain Conveyors, Permissible
6—15" Long Chain Conveyors, 350' centers w/400 DBH Long Mobile Head
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23—12" & 15" Jeffrey Chain Conveyors—61EW, 61-HG, 61W and 61AW
1—12" Goodman 90L Chain Conveyor
2—PT12 Long Piggyback Conveyors
2—PT15 Long Piggybacks Conveyors
8—PT15-B Long Piggybacks, 5 h.p. motors
82—Goodman Power Duckbills and Duckbill Hoists, Model 477G
47—Goodman G12½, G15 and G20 Drives
7—Goodman G12½ Shaker Conveyors w/10' 21½ Pans
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1—100KVA Gasoline Generator Unit
2—50KW, MG Sets, 125 V., D.C., 1200 rpm
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139—Transformers from 5KVA to 500KVA

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2—29B Joy Cutting Machines
1—29C Joy Cutting Machine
1—824 Goodman Slabber
4—7AU Sullivans
5—7B Sullivans
17—11B Sullivans, 35 & 50 h.p.
15—12AB & 12AA Standard Goodmans
3—12AA Universal Goodmans
9—212AA Baby Goodmans, 250 Volt
9—312 Goodman Cutting Machines, with Bugdusters
2—712 Goodman Cutting Machines, 250 V., D.C.
1—29U Jeffrey, 220/440 Volt, A.C. Rebuilt
3—35L Jeffrey Cutting Machines
49—35B and 35BB Jeffreys, A.C. & D.C. Bugdusters and Trucks available

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8—10 Ton Locomotives, 250 Volt, any gauge
15—8 Ton Locomotives, 250 Volt, any gauge
8—7 Ton Atlas Battery Locomotives
1—6 Ton Battery Locomotive—NEW
27—6 Ton Locomotives, any gauge
3—6 Ton Jeffrey MH150 Locomotives
14—6 Ton MH88 Jeffrey Locomotives
10—5 Ton Locomotives, 250 Volt
22—4 Ton Locomotives, 250 V., any gauge
4—4 Ton G. E. Battery Locomotive
2—4 Ton Mancha Battery Locomotives
1—4 Ton 82B G.E. Battery Locomotive
Spare Armatures and Trucks for most of above Locomotives

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1—Set Jeffrey Dewatering Screens
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1—30' x 42" Loading Boom
1—24' x 36" Loading Boom
Air Valves, Blowers, Pumps, New Screens, Parts for CMI Dryers, Speed Reducers, Feeders, practically Jeffrey Baum Jig in parts and many other parts for Tipple

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267—42" t.g. End Dump Cars, various makes
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22—44" t.g. Drop Bottom Cars, 10 Ton
133—44" t.g. Drop Bottom Cars, various sizes
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303—48" t.g. S.D. Drop Bottom Cars, 22" O.H.
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1,663'—1,000,000 CM Feeder Cable, Insulated
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3,197'—750,000 CM Bare Copper Feeder Wire
499'—350,000 CM Insulated Copper Feeder Wire
681'—300,000 CM Insulated Copper Feeder Wire
500'—4/0 Stranded Insulated Copper
17,757'—4/0 Trolley Wire
3,374'—6/0 Trolley Wire
1,258'—9 Section Trolley Wire
70,444'—4/0 Stranded Highline Wire
17,031'—2/0 Stranded Highline Wire
76,000'—1/0 Solid Copper Trans. Line
42,926'—#2 Stranded Transmission Wire
9,333'—#6 Solid Copper Transmission Wire
3,980'—4/0, 3 Cond. Neoprene Covered Cable
950'—2/0, 3 Cond. Ashydrox & Lead Covered Cable

MISCELLANEOUS

1—Canton Track Cleaner—Excellent
5—HKL Brown Fayro Car Spotters
11—CM Sullivan 5 h.p. Car Spotters
1—HKC Brownie Layer Loader Hoist
91—Hoists from 5 h.p. to 800 h.p.
6—Shop Constructed Jeeps, track mounted
582—Stationary Motors—½ to 800 h.p. of various specifications
1—Prefab Building, 40' x 84'
1—Prefab Building, 14'8" x 16'
108—Pumps from ¾" to 4300 GPM of various specifications
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1—330 GPM, 6" Pomona Deep Well Pump
1—14" Centrifugal Slurry Pump, w/15 h.p. Motor
3,318'—½" Galvanized Pipe
903'—1-½" Black Pipe
1,000'—2" Plastic Pipe
25,765'—2" Black Pipe
800'—3" Black Pipe
500'—4" Black Pipe
1—Rubber Vulcanizer, type 2
47—Room Blowers, Brown Fayro & Jeffrey
40—Mine Fans from 30" to 6' HI Pressure
1—35HCD Hydraulic Coal Drill
98—Coal Drills, 57ICP, 57ZCP, 57JCP, 47JCP, A6 and A7
1—WK29 Sullivan Air Compressor, 120 cu. ft. capacity, 48" t.g.
2—Cantrell Compressors, 120 cu. ft. capacity, 48" t.g.
15—Battery Chargers, various voltages
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22—Air Compressors of various sizes
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22—18" x 24" I Beams

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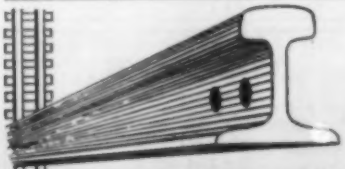

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1—Goodman 665 Loader on Crawlers, latest type 250 V. DC.
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4—Goodman 312 Cutting Machines, 17" high.
3—Goodman 412 Cutting Machines, 19" high.
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2—Goodman Hydraulic 512 Cutting Machines with Bugdusters.
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12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" ga.
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2—Jeffrey 29UC Universal Machines on Crawlers.
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3—Baby Goodman 212's, rebuilt, 250 V. DC.
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4—Goodman 312 Cutting Machines, 17" high.
3—Goodman 412 Cutting Machines, 19" high.
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1—15 Ton Goodman Locomotive, Anti-Friction, Contactors. Modern.
1—10 Ton Goodman Locomotive, Serial No. 4371—Type 32AO4-T, 250 Volt D.C., 42" track gauge. Height 34".

ROCK DUSTERS FOR SALE

1—MSA Track Mounted Rock Duster, 10 H.P., A.C. or D.C., high pressure, 30" high, any gauge.
2—MSA Bantam Rock Dusters, Rubber Tired, Portable.
2—MSA Bantam Rock Dusters, Skid Mounted.
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10—#11½ Vulcan-Denver Material Hoists, Complete with 3 H.P. D.C. Compound Wound 1750 RPM General Electric Motor.
2—Brownie Hoists, Model HKL—Good condition.
1—Browne Hoist, Model HKM—Good condition.

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1—PL11-14 Joy Elevator.
2—Joy PL11-16 Elevating Conveyors.

MACHINE TRUCKS FOR SALE

1—Goodman Low Vein Truck.
4—T2-5APE Joy Trucks, 250 Volts D.C. Permissible.

CHAIN CONVEYORS FOR SALE

5—61AM Jeffrey Chain Conveyors, 10 H.P. 300' long.
3—61HG Jeffrey Chain Conveyors, 5 H.P. 40' long.

DIESEL PLANTS FOR SALE

1—100 KW Caterpillar Diesel with marathon 100 KW, 250 Volts Generator. Like new.
1—60 KW, G.M. Diesel Generator Set, with 60 KW, 250 Volt D.C. Delco Generator.
1—100 KW Waukesha Diesel Generator with 220/440 Volts D.C.
1—100 KW Diesel Generator Unit, with G.M. Diesel Engine and 100 KW Generator.
1—D13000 Caterpillar Diesel Generator Unit—with Caterpillar engine and 75 KVA G.E. generator self-regulating, 220 Volt A.C.
1—250 KW Diesel Generating Plant, consisting of Westinghouse 250 KW 275 Volt Compound Wound Generator driven by Twin 6110 General Motors Engines. Complete with switchgear and all appurtenances. New in 1956.

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1—300KW Westinghouse Motor Generator Set, synchronous motor, 433 KW Output, 435 KVA, 2200 Volts, 1200 RPM. D.C. generator 300 KW, 275 Volts, 1200 RPM. Compound Wound. Complete with D.C. panel and switch gear.
3—50 KW G.E. and Westinghouse Motor Generator Sets, 2300 Volts A.C., 275 Volts D.C. Complete with switching gear.
1—200 KW Ridgeway Motor Generator Set, Complete with manual brakers, A.C. and D.C. Switchgear 2300/4000 Volts A.C. and 275 Volts D.C.
1—200 KW Ridgeway Motor Generator Set, Complete with switchgear and 1600 amp. I-T-E automatic circuit breaker, 2300 A.C., 275 Volts D.C.

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1—Goodman 99-5-GT-36 Tandem, 36" wide Belt, head and tail complete with 40 H.P. drive.
2 only 1200' 26" Belt Conveyors with 30 H.P. 250 Volt D.C. Drives.

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4—902, 250 Volts D.C. Westinghouse Motor Units, only.
1—R5E Jeffrey Reel and Motor, complete.
1—PL 11-14 Joy Elevator.
10—Goodman 512 Cutter Bars and Chains.
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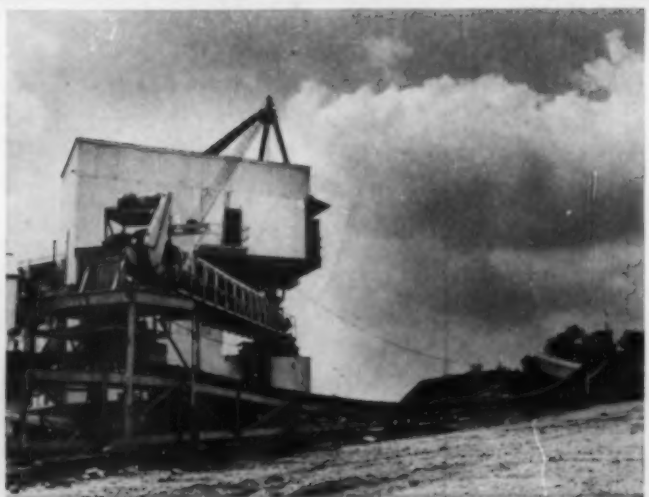
PREPARATION BY AUTOMATION

A Report on Clinchfield's Moss Mine #3

refuse takes a half-mile hike



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